NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

BUDGET ESTIMATES

FISCAL YEAR 2022

CONGRESSIONAL SUBMISSION

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Budget Estimates, Fiscal Year 2022
Congressional Submission

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Office of Marine & Aviation Operations

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U.S. DEPARTMENT OF COMMERCE

NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION

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- Deputy Assistant Secretary for International Fisheries

***Assistant Secretary for Environmental Observation & Prediction/Deputy Administrator**

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***Chief Scientist**

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- Communications & External Affairs
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* Reports to Under Secretary

Assistant Administrator
National Marine Fisheries Service

- Sustainable Fisheries
- Protected Resources
- Habitat Conservation
- Science & Technology
- Constituent Services

Assistant Administrator
National Ocean Service

- Coast Survey
- National Geodetic Survey
- Response and Restoration
- National Center for Coastal Ocean Science
- Coast Management
- National Marine Sanctuaries
- Center for Operational Oceanographic Products & Services
- U.S. Integrated Ocean Observing System

Assistant Administrator
Oceanic & Atmospheric Research

- Policy, Planning and Evaluation
- Climate Program Office
- National Sea Grant College Program
- Ocean Exploration & Research

Assistant Administrator
National Weather Service

- Planning and Programming for Service Delivery
- Chief Operating Officer

Assistant Administrator
National Environmental Satellite, Data & Information Service

- Satellite & Product Operations
- Satellite Applications & Research
- Projects, Planning, and Analysis
- National Centers for Environmental Information
- Geostationary Operational Environmental Satellite – R Series
- Joint Polar Satellite System
- Satellite Ground Services
- System Architecture & Advance Planning

Director
Office of Marine and Aviation Operations

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Department of Commerce
National Oceanic and Atmospheric Administration
Budget Estimates, Fiscal Year 2022

EXECUTIVE SUMMARY

For Fiscal Year (FY) 2022, the National Oceanic and Atmospheric Administration (NOAA) proposes a budget of $6,983,329,000 in discretionary appropriations, an increase of $1,543,531,000 from FY 2021 Enacted. This budget supports NOAA's goal of scaling up efforts to research, mitigate, and adapt to the impacts of the climate crisis through investments in research, observations and forecasting, restoration and resilience, ecologically sound offshore wind development, and equity through programs that touch everyday lives. It also includes additional investments in fleet support, satellites, and space weather. Some highlights of NOAA's priority initiatives are provided below. For current GPRA targets please see the FY 2022/2020 Annual Performance Plan and Report.

For FY 2022, NOAA requests $149,300,000 to strengthen core research capabilities to respond to increasing demand for the data, tools, and services that this research provides. NOAA requests $20,000,000 for climate-ready fisheries research that supports integrating climate science into fisheries assessments and management to address the impacts of climate change on fisheries, ecosystems, and communities. An investment of $10,000,000 to monitor climate-vulnerable species under the Endangered Species Act and the Marine Mammal Protection Act will also help NOAA better understand climate change-related impacts and the effectiveness of our management actions. In addition, NOAA requests $10,000,000 for a cross-NOAA initiative on weather, climate drivers, and marine resource responses to provide decision-makers with the information and tools they need to prepare for changing ocean conditions. These funding requests are critical to ensuring NOAA produces data, tools, and services that are publicly accessible to facilitate climate change decision-making nationwide.

Measuring and predicting climate change impacts are core to NOAA's mission. In FY 2022, NOAA requests $368,195,000 to expand, renew, and improve our comprehensive environmental observing and forecasting systems to better support climate change-related decision-making. NOAA's ability to meet national weather research and forecasting needs depends on significant investments in global ocean observation systems, atmospheric observations, a seasonal forecast system, coastal ocean modeling, and aircraft observation capabilities. In addition, NOAA requests $17,000,000 to optimize and upgrade the Integrated Dissemination Program to improve capacity issues that will ensure reliable weather and climate predictions, forecasts, and warnings. Investments in Fire Weather will provide capacity for producing an integrated suite of fire prediction and decision-support tools to allow fire managers to better plan for and respond to wildfires. NOAA also requests $5,000,000 to build a coastal inundation outlook capability at climate timescales to better support high-tide flood risk forecasting, and requests $7,000,000 to accelerate nationwide improvement of the Flood Inundation Mapping program.

Investments in ecological restoration and community resilience are integral to NOAA's climate strategy, and there is an increasing need for NOAA to create and foster natural and economic resilience along our coasts through our direct financial support, expertise, robust, on-the-ground partnerships, and place-based conservation activities. NOAA requests $259,330,000 to expand restoration and resilience efforts in ecosystems and communities, including through the National Coastal Resilience Fund and other grant

programs, as well as through short-term employment and training opportunities that support the national Civilian Climate Corps. NOAA requests $23,500,000 in an initiative to assess place-based climate vulnerability to support engagement with local partners to strengthen conservation in existing national marine sanctuaries and marine national monuments (where NOAA is a co-manager), and assess new sites for sanctuary designation. This investment would support Section 216(a) of Executive Order 14008 to conserve at least 30 percent of the Nation's lands and waters by 2030. NOAA also requests $6,000,000 to foster ecological resilience by ensuring that coastal communities have access to NOAA observations and data products to inform conservation action and local management decisions. These collective restoration efforts will have multiple benefits, including buffering storms, reducing flooding, enhancing carbon sequestration, creating community-based jobs, and others.

NOAA also requests $20,380,000 to support NOAA's role in achieving the Administration's goal to deploy 30 GW of offshore wind in the U.S. by 2030, while protecting biodiversity and promoting ocean co-use. Offshore wind development is rapidly expanding and represents a new use of our marine waters requiring substantial scientific and regulatory review. This investment will allow NOAA to expand capacity for assessing and minimizing the impacts of offshore wind activities on protected resources, fisheries, and marine habitats; reduce delays and minimize adverse economic impacts to the fishing industry and related coastal communities; and mitigate impacts to NOAA's fisheries surveys. These activities are essential to facilitating a clean energy economy through responsible renewable energy development while protecting ecosystems.

In FY 2022, NOAA proposes to develop a framework and lay the foundation for successfully integrating equity across the organization. NOAA requests an increase of $57,900,000 to establish new programs focused on equity and environmental justice internally to build a more diverse and inclusive workforce, and externally to reach a broader range of Americans through service delivery and other outreach to underserved or disadvantaged communities. NOAA requests an investment of $9,000,000 to establish a new initiative to expand services across multiple programs and increase the number of storm-ready communities, including those rural and underserved communities that are especially vulnerable to extreme weather. NOAA also requests $2,900,000 to accelerate progress on NOAA's diversity and inclusion implementation plan in support of identifying and addressing barriers to a diverse workforce to achieve a culture of equity and inclusion. NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity, and inclusion, make us well-positioned to make tangible improvements in the lives of those in the communities we serve, particularly those most vulnerable to climate change and its impacts.

The FY 2022 request also includes significant investments for NOAA's observational infrastructure. The NOAA fleet and satellites are two key components of the NOAA mission. Fleet maintenance and construction are critical to NOAA's ability to collect climate data, and NOAA's satellites collect essential data that serve, in addition to being primary inputs for weather forecasting, as a long-term record for monitoring key climate parameters. There is increasing demand for NOAA's fleet and satellite systems to collect more accurate information and expand observing capacity. This request also supports additional capacity for the forecasting of space weather events, which can have far-reaching impacts on our Nation's economy, communications, and national security.

Exhibit 4A

Department of Commerce
National Ocean and Atmospheric Administration
FY 2022 PROGRAM INCREASES / DECREASES / TERMINATIONS
(Dollar amounts in thousands)
(By Budget Program, Largest to Smallest)

Increases

Page No In CJ	Appropriations	Budget Program	Title of Increase	Positions	Budget Authority
NOS-127	ORF	NOS	Increasing Coastal Resilience through Nature-based Approaches	1	$34,000
NOS-123	ORF	NOS	Increasing Community Resilience through Coastal Management Grants	0	30,000
NOS-140	ORF	NOS	Assessing Place-based Climate Vulnerability for Conservation Action	15	23,500
NOS-91	ORF	NOS	Nature-based Solutions to Enhance the Resilience of Coastal Ecosystems	8	20,000
NOS-53	ORF	NOS	Monitoring Ecological Change Through Observing Systems	0	15,000
NOS-136	ORF	NOS	Place-based Resilience Training, Education, and Research	0	14,000
NOS-65	ORF	NOS	Prepare Coastal Communities for Disasters	9	12,000
NOS-131	ORF	NOS	Reducing Climate Threats to Coral Reefs	1	10,000
NOS-57	ORF	NOS	Advancing Coastal and Ocean Modelling and Prediction	0	10,000
NOS-23	ORF	NOS	Modernizing NOAA's Foundational Geospatial Positioning Framework and Water Level Observations for Climate Decision Support	20	10,000
NOS-77	ORF	NOS	Enhancing Community Based Marine Debris Prevention, Removal, and Research	4	9,000
NOS-110	ORF	NOS	Advancing Racial Equity through NOS Products and Services for Coastal Resilience	8	9,000
NOS-115	ORF	NOS	Regional Coastal Resilience Communities of Practice	9	7,500
NOS-34	ORF	NOS	Complete National Coastal Modeling Coverage	10	5,000
NOS-29	ORF	NOS	Building Climate Outlook Capabilities into a Next-Generation Coastal Inundation Dashboard	13	5,000
NOS-61	ORF	NOS	Coastal Moorings with Ecological Monitoring	0	4,000
NOS-39	ORF	NOS	Fostering Ecological Resilience Through Conservation Action (Navigation, Observations, and Positioning)	7	2,000

Department of Commerce
National Ocean and Atmospheric Administration
FY 2022 PROGRAM INCREASES / DECREASES / TERMINATIONS
(Dollar amounts in thousands)
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NOS-82	ORF	NOS	Fostering Ecological Resilience Through Conservation Action (Coastal Science, Assessment, Response and Restoration)	4	2,000
NOS-145	ORF	NOS	Fostering Ecological Resilience Through Conservation Action (Sanctuaries and Marine Protected Areas)	0	2,000
NOS-44	ORF	NOS	Data Management and Cyberinfrastructure (DMAC)	7	2,000
NOS-48	ORF	NOS	Enterprise Infrastructure Solutions (EIS) (Navigation, Observations, and Positioning)	0	1,000
NOS-88	ORF	NOS	Enterprise Infrastructure Solutions (EIS) (Coastal Science, Assessment, Response, and Restoration)	0	900
NOS-149	ORF	NOS	Enterprise Infrastructure Solutions (EIS) (Sanctuaries and Marine Protected Areas)	0	800
NOS-120	ORF	NOS	Enterprise Infrastructure Solutions (EIS) (Coastal Zone Management and Services)	0	300
NMFS-108	ORF	NMFS	Large Scale Habitat Restoration to Build Climate Resilience	0	40,000
NMFS-24	ORF	NMFS	Species Recovery Grants Program	1	10,000
NMFS-48	ORF	NMFS	Climate-Ready Fisheries: Climate-Informed Fisheries Assessments and Management Strategies for Changing Oceans	30	10,000
NMFS-74	ORF	NMFS	Climate-Ready Fisheries: Advancing Fisheries Survey Capacity for Commercially and Recreationally Valuable Species	6	10,000
NMFS-14	ORF	NMFS	Climate Vulnerable Species Under ESA and MMPA	20	10,000
NMFS-79	ORF	NMFS	Wind Energy: Scientific Survey Mitigation	15	8,380
NMFS-86	ORF	NMFS	Wind Energy: Fisheries Management	24	5,155
NMFS-54	ORF	NMFS	Wind Energy: Fisheries Science & Technical Reviews	14	3,648
NMFS-19	ORF	NMFS	Wind Energy: Protected Species Environmental Reviews and Science	15	3,197
NMFS-60	ORF	NMFS	Advancing and Improving Territorial Fisheries Science and Management	7	3,000
NMFS-91	ORF	NMFS	Education and Outreach for Diverse Participation in Regulatory and Science Processes	0	2,000
NMFS-66	ORF	NMFS	Community Social Vulnerability Indicators (CSVI) Toolbox	2	1,000
NMFS-95	ORF	NMFS	Workforce Training to Support the Seafood Industry	0	1,000

Department of Commerce
National Ocean and Atmospheric Administration
FY 2022 PROGRAM INCREASES / DECREASES / TERMINATIONS
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NMFS-71	ORF	NMFS	Enterprise Infrastructure Solutions (EIS) (Fisheries and Ecosystem Science Programs and Services)	0	200
OAR-58	ORF	OAR	Advanced Research Projects Agency for Climate Increase	0	40,000
OAR-89	ORF	OAR	Sea Grant Builds Resilient Coasts: Expanding Local and Regional Coastal Resilience Capacity and Community Assistance	2	35,000
OAR-98	ORF	OAR	Advancing Global Ocean Observing System Increase	3	23,000
OAR-21	ORF	OAR	Sustained Atmospheric Observations Increase	5	20,000
OAR-33	ORF	OAR	Enhancing Regional and Community Resilience by Scaling Up RISA Program and “Climate-Smart” Communities Initiative	3	10,000
OAR-27	ORF	OAR	Global-Nested High Resolution Model Increase	20	10,000
OAR-42	ORF	OAR	Marine Ecosystem Responses to Climate Change Increase	14	10,000
OAR-48	ORF	OAR	Providing Climate Change Projections out to 2050 to Inform Risk Management Increase	3	9,000
OAR-69	ORF	OAR	Fire Weather Increase	8	7,000
OAR-53	ORF	OAR	Precipitation Prediction Grand Challenge Increase	1	7,000
OAR-94	ORF	OAR	Sea Grant’s Service Equity: Assessing and Integrating Diversity, Equity, and Inclusion Actions to Support Underserved Communities	0	5,000
OAR-110	ORF	OAR	Uncrewed Systems Increase	4	4,000
OAR-38	ORF	OAR	Tribal Drought Resilience Initiative	0	3,000
OAR-75	ORF	OAR	Phased Array Radar Increase	0	2,500
OAR-118	PAC	OAR	R&D HPC Required to Meet Major NOAA Science Outcomes Increase	0	10,000
NWS-111	ORF	NWS	Optimize and Upgrade the Integrated Dissemination Program	0	17,000
NWS-146	ORF	NWS	Seasonal Forecast System (SFS v1)	9	15,000
NWS-127	ORF	NWS	Enterprise Infrastructure Solutions (EIS) (Dissemination)	0	11,400
NWS-165	ORF	NWS	Space Weather Research to Operations (Science and Technology Integration)	0	4,000
NWS-107	ORF	NWS	Operationalize Flood Inundation Mapping (Dissemination)	0	3,750

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NWS-132	ORF	NWS	Expand and Enhance NWS Services to Vulnerable/Underserved Communities for Extreme Events: Dissemination Enhancements	0	3,500
NWS-159	ORF	NWS	Co-Development of Sub-seasonal to Seasonal (S2S) Decision Support Services to Mitigate the Impacts of Extreme Events and Enable a Resilient Society (Science and Technology Integration)	8	3,500
NWS-20	ORF	NWS	Improve Climate and Weather Predictions by Maintaining a Recapitalized Tropical Atmosphere Ocean (TAO) Array	0	2,441
NWS-152	ORF	NWS	Seamless Weather to Climate Fire Weather Predictions to Improve Resilience and Disaster Mitigation (Science and Technology Integration)	2	2,000
NWS-48	ORF	NWS	Expand and Enhance NWS Services to Vulnerable/Underserved Communities for Extreme Events: Improve Service Delivery (Central Processing)	0	2,000
NWS-89	ORF	NWS	Expand and Enhance NWS Services to Vulnerable/Underserved Communities for Extreme Events: Assess and Understand User Needs	3	1,500
NWS-16	ORF	NWS	Enhance the Meteorological Assimilation Data Ingest System (MADIS) to Include Important Climate Datasets	0	1,200
NWS-81	ORF	NWS	Expand and Enhance NWS Services to Vulnerable/Underserved Communities for Extreme Events: Improve Service Delivery (Analyze, Forecast, and Support)	0	1,000
NWS-96	ORF	NWS	Increase NOAA Capability to Support Minority Internship Opportunities	0	1,000
NWS-52	ORF	NWS	Space Weather Research to Operations (Central Processing)	0	1,000
NWS-43	ORF	NWS	Co-Development of Sub-Seasonal to Seasonal (S2S) Decision Support Services to Mitigate the Impacts of Extreme Events and Enable a Resilient Society (Central Processing)	0	900
NWS-24	ORF	NWS	Enterprise Infrastructure Solutions (EIS) (Observations)	0	750
NWS-65	ORF	NWS	Operationalize Flood Inundation Mapping (Analyze, Forecast, and Support)	0	750
NWS-37	ORF	NWS	Seamless Weather to Climate Fire Weather Predictions to Improve Resilience and Disaster Mitigation (Central Processing)	0	750
NWS-116	ORF	NWS	Seamless Weather to Climate Fire Weather Predictions to Improve Resilience and Disaster Mitigation (Dissemination)	0	750
NWS-33	ORF	NWS	Operationalize Flood Inundation Mapping (Central Processing)	0	500
NWS-69	ORF	NWS	Seamless Weather to Climate Fire Weather Predictions to Improve Resilience and Disaster Mitigation (Analyze, Forecast, and Support)	1	500

Department of Commerce
National Ocean and Atmospheric Administration
FY 2022 PROGRAM INCREASES / DECREASES / TERMINATIONS
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NWS-76	ORF	NWS	Co-Development of Sub-Seasonal to Seasonal (S2S) Decision Support Services to Mitigate the Impacts of Extreme Events and Enable a Resilient Society (Analyze, Forecast, and Support)	0	500
NWS-122	ORF	NWS	Co-Development of Sub-Seasonal to Seasonal (S2S) Decision Support Services to Mitigate the Impacts of Extreme Events and Enable a Resilient Society (Dissemination)	0	400
NWS-178	PAC	NWS	Improve Climate and Weather Predictions by Recapitalizing the Tropical Atmosphere Ocean (TAO) Array	0	8,059
NWS-182	PAC	NWS	Enterprise Infrastructure Solutions (EIS) (Observations)	0	470
NESDIS-41	ORF	NESDIS	Advance Core Activities	0	8,000
NESDIS-34	ORF	NESDIS	Satellite and Product Operations Deferred and Extended Maintenance	0	7,500
NESDIS-44	ORF	NESDIS	Ocean Remote Sensing	0	6,505
NESDIS-64	ORF	NESDIS	Improving Local, State, and Regional Climate Services	0	6,300
NESDIS-72	ORF	NESDIS	Climate Data Records	0	6,000
NESDIS-68	ORF	NESDIS	Enhance Enterprise Data Stewardship and Archiving	0	5,300
NESDIS-76	ORF	NESDIS	Sustainment of Cloud Framework for Environmental Data	0	4,900
NESDIS-48	ORF	NESDIS	Advancing Fire Weather Priorities	3	4,000
NESDIS-53	ORF	NESDIS	Expanding Arctic and Antarctic Datasets and Products	0	2,000
NESDIS-37	ORF	NESDIS	Enterprise Infrastructure Solutions (EIS) (Office of Satellite and Product Operations)	0	1,500
NESDIS-56	ORF	NESDIS	U.S. Group on Earth Observations (USGEO)	0	500
NESDIS-101	PAC	NESDIS	Geostationary Extended Observations (GeoXO)	6	455,000
NESDIS-115	PAC	NESDIS	LEO Weather Satellites	7	78,330
NESDIS-141	PAC	NESDIS	Space Weather Next	10	55,000
NESDIS-136	PAC	NESDIS	Space Weather Follow On	0	38,785
NESDIS-147	PAC	NESDIS	Data-Source Agnostic Common Services (DACS)	0	25,007

Department of Commerce
National Ocean and Atmospheric Administration
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NESDIS-161	PAC	NESDIS	Joint Venture Partnerships	1	25,000
NESDIS-131	PAC	NESDIS	Polar Operational Environmental Satellites (POES) Extension	0	20,000
NESDIS-156	PAC	NESDIS	Commercial Data Purchase	1	13,000
NESDIS-152	PAC	NESDIS	Commercial Weather Data Pilot (CWDP)	0	5,000
NESDIS-127	PAC	NESDIS	COSMIC-2/GNSS RO	0	2,208
NESDIS-95	PAC	NESDIS	GOES-R Series Sustainment	0	1,000
MS-98	ORF	MS	Improve NOAA's Cybersecurity	0	19,500
MS-39	ORF	MS	Increase Facility Program Capacity	24	5,000
MS-55	ORF	MS	NOAA Open Data Dissemination	4	3,300
MS-101	ORF	MS	Educational Partnership Program Climate Cooperative Science Center	0	3,000
MS-88	ORF	MS	Accelerate NOAA's Diversity and Inclusion Plan	6	2,900
MS-105	ORF	MS	Engaging New and Diverse Audiences with NOAA Science	4	2,900
MS-35	ORF	MS	Acquisition and Grants Office	13	2,530
MS-60	ORF	MS	NOAA Cloud Program	1	2,500
MS-111	ORF	MS	Environmental Literacy Grants for Community Resilience Education	0	2,000
MS-30	ORF	MS	Strategic Communication and Outreach to Underserved Communities	9	2,000
MS-65	ORF	MS	Enterprise Infrastructure Solutions (EIS) (Mission Services and Management)	2	1,770
MS-78	ORF	MS	NOAA Recruiting Program	1	1,500
MS-44	ORF	MS	Implement a Budget Position Management System	0	1,400
MS-93	ORF	MS	Workplace Violence Prevention and Response Program – Racial Equity/Wellness	3	900
MS-47	ORF	MS	Equity Assessment and Implementation Support In Compliance with EO 13985	0	900
MS-51	ORF	MS	NOAA Finance Transaction Processing	7	800

Department of Commerce
National Ocean and Atmospheric Administration
FY 2022 PROGRAM INCREASES / DECREASES / TERMINATIONS
(Dollar amounts in thousands)
(By Budget Program, Largest to Smallest)

MS-83	ORF	MS	NOAA Facilitation Network	1	600
MS-69	ORF	MS	Spectrum	2	500
MS-26	ORF	MS	NOAA Tribal Liaison	2	500
MS-74	ORF	MS	Strengthen Diversity in NOAA IT	0	400
MS-117	PAC	MS	Charleston, SC Pier and Facility Recapitalization	0	38,000
OMAO-11	ORF	OMAO	Days at Sea Increase	21	19,669
OMAO-25	ORF	OMAO	Increased Aircraft Operations	10	3,561
OMAO-41	ORF	OMAO	NOAA Corps Officers	10	2,570
OMAO-33	ORF	OMAO	Autonomous Uncrewed Technology Operations	2	1,500
OMAO-16	ORF	OMAO	Office of Health Services Increase	0	1,200
OMAO-46	ORF	OMAO	NOAA Corps Recruitment	0	800
OMAO-19	ORF	OMAO	Enterprise Infrastructure Solutions (EIS) (Marine Operations and Maintenance)	0	200
OMAO-70	PAC	OMAO	Second Aircraft to Meet National Weather Research and Forecasting Needs	0	100,000
OMAO-58	PAC	OMAO	NOAA Ship *Ronald H. Brown* Mid-life Repair	0	63,000
OMAO-74	PAC	OMAO	Complete G-IV Replacement	0	15,000
OMAO-62	PAC	OMAO	P-3 Service Depot Level Maintenance	0	5,000
OMAO-66	PAC	OMAO	Uncrewed Technology Acquisitions	0	2,500
N/A	ORF	NOS	Increase- FY 2022 Programmatic Restoral (WCOSS) (Non-Narrative)	0	5,180
N/A	ORF	NOS	Increase- FY 2022 Programmatic Restoral (G550) (Non-Narrative)	0	745
N/A	ORF	NMFS	Increase- FY 2022 Programmatic Restoral (WCOSS) (Non-Narrative)	0	9,051
N/A	ORF	NMFS	Increase- FY 2022 Programmatic Restoral (G550) (Non-Narrative)	0	826
N/A	ORF	OAR	Increase- FY 2022 Programmatic Restoral (WCOSS) (Non-Narrative)	0	2,967

Department of Commerce
National Ocean and Atmospheric Administration
FY 2022 PROGRAM INCREASES / DECREASES / TERMINATIONS
(Dollar amounts in thousands)
(By Budget Program, Largest to Smallest)

N/A	ORF	OAR	Increase- FY 2022 Programmatic Restoral (G550) (Non-Narrative)	0	332
N/A	ORF	NWS	Increase- FY 2022 Programmatic Restoral (WCOSS) (Non-Narrative)	0	7,489
N/A	ORF	NWS	Increase- FY 2022 Programmatic Restoral (G550) (Non-Narrative)	0	659
N/A	ORF	NESDIS	Increase- FY 2022 Programmatic Restoral (WCOSS) (Non-Narrative)	0	2,265
N/A	ORF	NESDIS	Increase- FY 2022 Programmatic Restoral (G550) (Non-Narrative)	0	323
N/A	ORF	MS	Increase- FY 2022 Programmatic Restoral (WCOSS) (Non-Narrative)	0	2,820
N/A	ORF	MS	Increase- FY 2022 Programmatic Restoral (G550) (Non-Narrative)	0	528
N/A	ORF	OMAO	Increase- FY 2022 Programmatic Restoral (G550) (Non-Narrative)	0	87
	Total, Increases			486	$1,728,707

Decreases

Page No In CJ	Appropriations	Budget Program	Title of Decrease	Positions	Budget Authority
NOS-51	ORF	NOS	Decrease Congressionally Directed Regional Geospatial Modeling Grants	0	($5,396)
NMFS-84	ORF	NMFS	Northeast Multispecies Fishery	0	(3,448)
OAR-104	ORF	OAR	Sustained Ocean Observations and Monitoring Decrease	0	(2,000)
NWS-170	ORF	NWS	Delay the COASTAL Act Implementation	0	(3,686)
NESDIS-122	PAC	NESDIS	Cooperative Data and Rescue Services (CDARS)	(3)	(13,100)
NESDIS-107	PAC	NESDIS	Polar Weather Satellites (PWS)	0	(252,835)
N/A	PAC	NWS	Decrease- FY 2022 Programmatic Restoral (WCOSS) (Non-Narrative)	0	(29,772)
N/A	PAC	OMAO	Decrease- FY 2022 Programmatic Restoral (G550) (Non-Narrative)	0	(3,500)
	Total, Decreases			(3)	($313,737)

Department of Commerce
National Oceanic and Atmospheric Administration
FY 2022 TRANSFER SUMMARY TABLE
(Dollar amounts in thousands)
(Grouped by Title of Transfer, Largest to Smallest)

Page No In CJ	Budget Program	Appropriations	Title of Transfer	Positions	Budget Authority
OMAO-4	OMAO	ORF	NOAA Corps Consolidation Transfer to NOAA Commissioned Officer Corps	57	7,337
	NOS	ORF	NOAA Corps Consolidation Transfer from NOS	(24)	(2,926)
NOS-4			Navigation, Observations, and Positioning	[(18)]	[(2,044)]
NOS-5			Coastal Science, Assessment, Response & Restoration	[(4)]	[(319)]
NOS-6			Sanctuaries and Marine Protected Areas	[(2)]	[(563)]
NMFS-4	NMFS	ORF	NOAA Corps Consolidation Transfer from Fisheries Data Collection, Surveys, and Assessments	(13)	(1,562)
	OAR	ORF	NOAA Corps Consolidation Transfer from OAR	(7)	(911)
OAR-7			NOAA Corps Consolidation Transfer from Climate Laboratories & Cooperative Institutes	[(2)]	[(261)]
OAR-8			NOAA Corps Consolidation Transfer from Ocean Laboratories & Cooperative Institutes	[(3)]	[(390)]
OAR-9			NOAA Corps Consolidation Transfer from Ocean Exploration and Research	[(1)]	[(130)]
OAR-10			NOAA Corps Consolidation Transfer from Sustained Ocean Observations and Monitoring	[(1)]	[(130)]
	NWS	ORF	NOAA Corps Consolidation Transfer from NWS	(5)	(724)
NWS-5			NOAA Corps Consolidation Transfer from Observations	[(2)]	[(324)]
NWS-6			NOAA Corps Consolidation Transfer from Central Processing	[(2)]	[(346)]
NWS-7			NOAA Corps Consolidation Transfer Analyze, Forecast and Support	[(1)]	[(54)]
MS-4	MS	ORF	NOAA Corps Consolidation Transfer from Mission Services and Management	(4)	(661)
	NESDIS	ORF	NOAA Corps Consolidation Transfer from NESDIS	(4)	(553)
NESDIS-18			NOAA Corps Consolidation Transfer from Satellite and Product Operations	[(2)]	[(277)]
NESDIS-19			NOAA Corps Consolidation Transfer from Product Development, Readiness & Application	[(2)]	[(276)]

Department of Commerce
National Oceanic and Atmospheric Administration
FY 2022 TRANSFER SUMMARY TABLE
(Dollar amounts in thousands)
(Grouped by Title of Transfer, Largest to Smallest)

MS-5	MS	ORF	WCF to A&R Transfer to Mission Services and Management	0	3,071
MS-6	MS	ORF	WCF to A&R Transfer from Payment from the DOC Working Capital Fund	0	(3,071)
NOS-7	NOS	ORF	Hydrology and Water Resources Cooperative Institute Transfer to Competitive Research	0	1,000
NOS-8	NOS	ORF	Hydrology and Water Resources Cooperative Institute Transfer from Coastal Science Assessment, Response & Restoration	0	(1,000)
MS-7	MS	ORF	Working Capital Fund Transfer to DOC Departmental Management	0	(396)
		Total Transfers		0	(396)

Department of Commerce
National Oceanic and Atmospheric Administration
NOAA Headquarters Administrative Costs
(Dollar amounts in thousands)

In FY 2022, NOAA's Line/Staff Office Headquarters will use $376,975,902 and 1,252.2 FTE to support general management activities, financial and budgeting, and IT-related expenses, as well as to support facilities and other general operating costs. These funds also include support for service contracts, utilities, and rent charges from the GSA. Specifically, NOAA's Line/Staff Office Headquarters will use administrative funds to support the following:

Headquarters Administrative Support Type	Description	NOS Amount	NOS FTE	NMFS Amount	NMFS FTE	OAR Amount PB	OAR FTE	NWS Amount	NWS FTE	NESDIS Amount	NESDIS FTE	MS Amount	MS FTE	OMAO Amount	OMAO FTE	Total Amount	Total FTE
General Management & Direction/Executive Management	Includes Assistant Administrator's office, public affairs, information services	$9,496,596	41.0	$15,794,433	39.6	$8,423,712	26.5	$14,933,233	57.4	$11,435,599	33	$30,164,000	125	$2,584,020.74	10.0	**$92,831,594.48**	**332.5**
Budget & Finance	Includes Budget, Finance and Accounting	$3,089,000	13.0	$7,368,267	27.8	$5,149,906	29.3	$5,686,737	20.1	$6,442,982	21	$51,975,000	193	$2,846,308.18	14.0	**$82,558,200.87**	**318.2**
Facilities/Other Administrative (CAO Functions)	Includes Facilities and Security costs, as well as other CAO related activities	$1,857,654	1.0	$1,345,365	6.0	$3,505,413	12.3	$8,130,568	17	$1,898,700	8	$40,417,000	110	$927,453.20	0.0	**$58,082,153.87**	**154.3**
Human Resources	All HR services, including Equal Employment Opportunity	$1,235,288	6.0	$2,705,472	11.6	$2,009,711	11.0	$5,887,869	24.5	$4,521,143	10	$33,787,000	133	$1,431,988.69	11.0	**$51,578,470.63**	**207.1**
Acquisitions and Grants	Contracts, grants and procurement implementation	$389,637	2.0	$2,132,921	11.6	$2,000,000	0.0	$0	0	$552,100	3	$17,750,000	56	$0.00	0.0	**$22,824,657.72**	**72.6**
Information Technology	Includes IT-related expenses and other CIO related activities	$8,418,932	12.0	$6,910,098	22.3	$2,512,617	6.0	$8,475,786	16.4	$11,948,251	25	$28,982,000	78	$1,853,139.95	8.0	**$69,100,824.23**	**167.7**
Total		**24,487,107**	**75.0**	**36,256,556**	**118.9**	**23,601,360**	**85.0**	**43,114,193**	**135.4**	**36,798,775**	**100.0**	**203,075,000**	**695.0**	**9,642,911**	**43.0**	**376,975,902**	**1,252.3**

*Amounts above to not include NOAA's Direct Bill

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Department of Commerce
National Oceanic and Atmospheric Administration
Research and Development (R&D) Investments
(Dollar amounts in thousands)

The NOAA FY 2022 Budget estimates for R&D investments are the result of an integrated requirements-based strategic planning process. This process provides the structure to link NOAA's strategic vision with programmatic detail and budget development, with the goal of maximizing resources while optimizing capabilities.

The NOAA Research Council - an internal body composed of senior scientific personnel from every Line Office in the agency - developed NOAA's most recent Five-Year Research and Development Plan (FY 2013-2017). This plan guides NOAA's R&D activities and provides a common understanding among NOAA's leadership, its workforce, its partners, constituents and Congress on the value of NOAA's R&D activities.

NOAA requests $1,030.9 million for investments (excluding equipment and facilities) in R&D in the FY 2022 Budget. The distribution by line offices is provided in the table below.

Line Office	Research	Development	Total R&D (excluding Equipment and Facilities)	Equipment and Facilities	Total R&D with Equipment and Facilities
NOS	120,945	17,537	138,482	0	138,482
NMFS	54,600	20,824	75,424	0	75,424
OAR	558,143	134,893	693,036	63,629	756,665
NWS	11,100	24,873	35,973	780	36,753
NESDIS	50,243	0	50,243	0	50,243
OMAO	37,702	0	37,702	378,568	416,270
MS	0	0	0	38,000	38,000
Total	**$832,733**	**$198,127**	**$1,030,860**	**$480,977**	**$1,511,837**

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Department of Commerce
National Oceanic and Atmospheric Administration
CONTROL TABLE
(Dollar amounts in thousands)

NATIONAL OCEAN SERVICE

Direct Obligations

FY 2022 Proposed Operating Plan	FY 2021 Spend Plan	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	FY 2022 Base	FY 2022 Programmatic Restoral (WCOSS)	FY 2022 Programmatic Restoral (G550)	POS	FTE	FY 2022 Program Changes	POS	FTE	FY 2022 Estimate
Navigation, Observations and Positioning																
Navigation, Observations and Positioning	159,613	(18)	(18)	6,536	(2,044)	618	585	164,105	2,476	411	57	42	19,604	675	627	186,596
Hydrographic Survey Priorities/Contracts	32,000	0	0	0	0	24	24	32,000	0	0	0	0	0	24	24	32,000
IOOS Regional Observations	40,500	0	0	0	0	0	0	40,500	0	0	0	0	29,000	0	0	69,500
Total, Navigation, Observations and Positioning	**232,113**	**(18)**	**(18)**	**6,536**	**(2,044)**	**642**	**609**	**236,605**	**2,476**	**411**	**57**	**42**	**48,604**	**699**	**651**	**288,096**
Coastal Science and Assessment																
Coastal Science, Assessment, Response and Restoration	85,240	(4)	(4)	3,246	(1,319)	274	259	87,167	1,202	58	17	13	23,900	291	272	112,327
Competitive Research	21,000	0	0	0	1,000	3	3	22,000	0	0	8	6	20,000	11	9	42,000
Total, Coastal Science and Assessment	**106,240**	**(4)**	**(4)**	**3,246**	**(319)**	**277**	**262**	**109,167**	**1,202**	**58**	**25**	**19**	**43,900**	**302**	**281**	**154,327**
Ocean and Coastal Management and Services																
Coastal Zone Management and Services	45,890	0	0	1,289	0	136	115	47,179	674	136	17	13	16,800	153	128	64,789
Coastal Zone Management Grants	78,500	0	0	0	0	0	0	78,500	0	0	0	0	30,000	0	0	108,500
National Oceans and Coastal Security Fund	34,000	0	0	0	0	0	0	34,000	0	0	1	1	34,000	1	1	68,000
Coral Reef Program	33,000	0	0	193	0	25	25	33,193	0	0	1	1	10,000	26	26	43,193
National Estuarine Research Reserve System	28,500	0	0	0	0	0	0	28,500	0	0	0	0	14,000	0	0	42,500
Sanctuaries and Marine Protected Areas	55,532	(2)	(2)	2,266	(563)	186	177	57,235	828	140	15	11	26,300	201	188	84,503
Total, Ocean and Coastal Management and Services	**275,422**	**(2)**	**(2)**	**3,748**	**(563)**	**347**	**317**	**278,607**	**1,502**	**276**	**34**	**26**	**131,100**	**381**	**343**	**411,485**
Total, NOS - Discretionary ORF	**613,775**	**(24)**	**(24)**	**13,530**	**(2,926)**	**1,266**	**1,188**	**624,379**	**5,180**	**745**	**116**	**87**	**223,604**	**1,382**	**1,275**	**853,908**
Total, NOS - Discretionary PAC	8,500	0	0	0	0	1	1	8,500	0	0	0	0	0	1	1	8,500
Total, NOS - Other Discretionary Accounts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Discretionary Total - NOS	**622,275**	**(24)**	**(24)**	**13,530**	**(2,926)**	**1,267**	**1,189**	**632,879**	**5,180**	**745**	**116**	**87**	**223,604**	**1,383**	**1,276**	**862,408**
Total, NOS - Mandatory Accounts	77,302	0	0	0	(55,082)	32	32	22,220	0	0	0	0	0	32	32	22,220
GRAND TOTAL NOS	**699,577**	**(24)**	**(24)**	**13,530**	**(58,008)**	**1,299**	**1,221**	**655,099**	**5,180**	**745**	**116**	**87**	**223,604**	**1,415**	**1,308**	**884,628**

Department of Commerce
National Oceanic and Atmospheric Administration
CONTROL TABLE
(Dollar amounts in thousands)

NATIONAL MARINE FISHERIES SERVICE

Direct Obligations

FY 2022 Proposed Operating Plan	FY 2021 Spend Plan	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	FY 2022 Base	FY 2022 Programmatic Restoral (WCOSS)	FY 2022 Programmatic Restoral (G550)	POS	FTE	FY 2022 Program Changes	POS	FTE	FY 2022 Estimate
Protected Resources Science and Management																
Marine Mammals, Sea Turtles, and Other Species	123,889	0	0	4,596	0	489	402	128,485	1,165	110	35	26	13,197	524	428	142,957
Species Recovery Grants	6,933	0	0	12	0	4	2	6,945	67	0	1	1	10,000	5	3	17,012
Atlantic Salmon	6,438	0	0	233	0	23	22	6,671	62	0	0	0	0	23	22	6,733
Pacific Salmon	66,246	0	0	3,425	0	337	288	69,671	621	133	0	0	0	337	288	70,425
Total, Protected Resources Science and Management	**203,506**	**0**	**0**	**8,266**	**0**	**853**	**714**	**211,772**	**1,915**	**243**	**36**	**27**	**23,197**	**889**	**741**	**237,127**
Fisheries Science and Management																
Fisheries and Ecosystem Science Programs and Services	145,226	0	0	5,828	0	635	506	151,054	1,398	303	53	41	17,848	688	547	170,603
Fisheries Data Collections, Surveys, and Assessments	174,261	(13)	(13)	4,900	(1,562)	465	424	177,599	1,666	0	21	16	18,380	486	440	197,645
Observers and Training	54,936	0	0	1,116	0	158	110	56,052	523	9	0	0	(3,448)	158	110	53,136
Fisheries Management Programs and Services	122,540	0	0	4,791	0	471	434	127,331	1,184	112	24	18	8,155	495	452	136,782
Aquaculture	17,351	0	0	378	0	38	36	17,729	144	5	0	0	0	38	36	17,878
Salmon Management Activities	61,387	0	0	397	0	40	36	61,784	556	107	0	0	0	40	36	62,447
Regional Councils and Fisheries Commissions	41,114	0	0	1,402	0	13	8	42,516	386	0	0	0	0	13	8	42,902
Interjurisdictional Fisheries Grants	3,333	0	0	7	0	2	1	3,340	32	0	0	0	0	2	1	3,372
Total, Fisheries Science and Management	**620,148**	**(13)**	**(13)**	**18,819**	**(1,562)**	**1,822**	**1,555**	**637,405**	**5,889**	**536**	**98**	**75**	**40,935**	**1,920**	**1,630**	**684,765**
Enforcement																
Enforcement	74,278	0	0	2,731	0	257	214	77,009	704	18	0	0	0	257	214	77,731
Total, Enforcement	**74,278**	**0**	**0**	**2,731**	**0**	**257**	**214**	**77,009**	**704**	**18**	**0**	**0**	**0**	**257**	**214**	**77,731**
Habitat Conservation and Restoration																
Habitat Conservation and Restoration	57,053	0	0	2,079	0	185	179	59,132	543	29	0	0	40,000	185	179	99,704
Subtotal, Habitat Conservation & Restoration	**57,053**	**0**	**0**	**2,079**	**0**	**185**	**179**	**59,132**	**543**	**29**	**0**	**0**	**40,000**	**185**	**179**	**99,704**
Total, NMFS - Discretionary ORF	**954,985**	**(13)**	**(13)**	**31,895**	**(1,562)**	**3,117**	**2,662**	**985,318**	**9,051**	**826**	**134**	**102**	**104,132**	**3,251**	**2,764**	**1,099,327**
Total, NMFS - Discretionary PAC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total, NMFS - Other Discretionary Accounts	65,349	0	0	0	0	2	2	65,349	0	0	0	0	0	2	2	65,349
Discretionary Total - NMFS	**1,020,334**	**(13)**	**(13)**	**31,895**	**(1,562)**	**3,119**	**2,664**	**1,050,667**	**9,051**	**826**	**134**	**102**	**104,132**	**3,253**	**2,766**	**1,164,676**
Total, NMFS - Mandatory Accounts	41,945	0	0	0	(9,163)	40	27	32,782	0	0	0	0	0	40	27	32,782
GRAND TOTAL NMFS	**1,062,279**	**(13)**	**(13)**	**31,895**	**(10,725)**	**3,159**	**2,691**	**1,083,449**	**9,051**	**826**	**134**	**102**	**104,132**	**3,293**	**2,793**	**1,197,458**

Department of Commerce
National Oceanic and Atmospheric Administration
CONTROL TABLE
(Dollar amounts in thousands)

OFFICE OF OCEANIC AND ATMOSPHERIC RESEARCH
Direct Obligations

FY 2022 Proposed Operating Plan	FY 2021 Spend Plan	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	FY 2022 Base	FY 2022 Programmatic Restoral (WCOSS)	FY 2022 Programmatic Restoral (G550)	POS	FTE	FY 2022 Program Changes	POS	FTE	FY 2022 Estimate
Climate Research																
Climate Laboratories & Cooperative Institutes	74,750	(2)	(2)	1,705	(261)	207	202	76,194	653	97	25	19	30,000	232	221	106,944
Regional Climate Data & Information	42,107	0	0	476	0	28	26	42,583	364	29	3	2	13,000	31	28	55,976
Climate Competitive Research	63,795	0	0	793	0	56	53	64,588	160	45	18	14	66,000	74	67	130,793
Total, Climate Research	**180,652**	**(2)**	**(2)**	**2,974**	**(261)**	**291**	**281**	**183,365**	**1,177**	**171**	**46**	**35**	**109,000**	**337**	**316**	**293,713**
Weather & Air Chemistry Research																
Weather Laboratories & Cooperative Institutes																
Weather Laboratories & Cooperative Institutes	84,980	0	0	2,165	0	282	274	87,145	497	23	0	0	0	282	274	87,665
Subtotal, Weather Laboratories and Cooperative Institutes	**84,980**	**0**	**0**	**2,165**	**0**	**282**	**274**	**87,145**	**497**	**23**	**0**	**0**	**0**	**282**	**274**	**87,665**
Weather and Air Chemistry Research Programs																
U.S. Weather Research Program (USWRP)	26,425	0	0	263	0	10	10	26,688	59	16	8	6	7,000	18	16	33,763
Tornado Severe Storm Research / Phased Array Radar	14,336	0	0	130	0	3	3	14,466	36	10	0	0	2,500	3	3	17,012
Joint Technology Transfer Initiative	12,950	0	0	130	0	5	5	13,080	39	11	0	0	0	5	5	13,130
Subtotal, Weather and Air Chemistry Research Programs	**53,711**	**0**	**0**	**523**	**0**	**18**	**18**	**54,234**	**134**	**37**	**8**	**6**	**9,500**	**26**	**24**	**63,905**
Total, Weather and Air Chemistry Research	**138,691**	**0**	**0**	**2,688**	**0**	**300**	**292**	**141,379**	**631**	**60**	**8**	**6**	**9,500**	**308**	**298**	**151,570**
Ocean, Coastal, and Great Lakes Research																
Ocean Laboratories and Cooperative Institutes																
Ocean Laboratories and Cooperative Institutes	36,098	(3)	(3)	1,000	(390)	131	128	36,708	380	22	0	0	0	131	128	37,110
Subtotal, Ocean Laboratories and Cooperative Institutes	**36,098**	**(3)**	**(3)**	**1,000**	**(390)**	**131**	**128**	**36,708**	**380**	**22**	**0**	**0**	**0**	**131**	**128**	**37,110**
National Sea Grant College Program																
National Sea Grant College Program	74,950	0	0	694	0	20	19	75,644	50	0	2	1	40,000	22	20	115,694
Marine Aquaculture Program	13,000	0	0	124	0	4	4	13,124	0	0	0	0	0	4	4	13,124
Subtotal, National Sea Grant College Program	**87,950**	**0**	**0**	**818**	**0**	**24**	**23**	**88,768**	**50**	**0**	**2**	**1**	**40,000**	**26**	**24**	**128,818**
Ocean Exploration and Research	42,639	(1)	(1)	540	(130)	39	36	43,049	331	30	0	0	0	39	36	43,410
Integrated Ocean Acidification	15,404	0	0	198	0	14	14	15,602	86	10	0	0	0	14	14	15,698
Sustained Ocean Observations and Monitoring	45,063	(1)	(1)	516	(130)	30	28	45,449	312	33	3	2	21,000	33	30	66,794
National Oceanographic Partnership Program	2,994	0	0	29	0	1	1	3,023	0	6	0	0	0	1	1	3,029
Total, Ocean, Coastal, and Great Lakes Research	**230,148**	**(5)**	**(5)**	**3,101**	**(650)**	**239**	**230**	**232,599**	**1,159**	**101**	**5**	**3**	**61,000**	**244**	**233**	**294,859**
Innovative Research & Technology																
High Performance Computing Initiatives	17,800	0	0	227	0	17	16	18,027	0	0	0	0	0	17	16	18,027
Uncrewed Systems	0	0	0	0	0	0	0	0	0	0	4	3	4,000	4	3	4,000
Total, Innovative Research & Technology	**17,800**	**0**	**0**	**227**	**0**	**17**	**16**	**18,027**	**0**	**0**	**4**	**3**	**4,000**	**21**	**19**	**22,027**
Total, OAR - Discretionary ORF	**567,291**	**(7)**	**(7)**	**8,990**	**(911)**	**847**	**819**	**575,370**	**2,967**	**332**	**63**	**47**	**183,500**	**910**	**866**	**762,169**
Total, OAR - Discretionary PAC	43,500	0	0	0	0	1	1	43,500	0	0	0	0	10,000	1	1	53,500
Discretionary Total - OAR	**610,791**	**(7)**	**(7)**	**8,990**	**(911)**	**848**	**820**	**618,870**	**2,967**	**332**	**63**	**47**	**193,500**	**911**	**867**	**815,669**

Department of Commerce
National Oceanic and Atmospheric Administration
CONTROL TABLE
(Dollar amounts in thousands)

NATIONAL WEATHER SERVICE

Direct Obligations

FY 2022 Proposed Operating Plan	FY 2021 Spend Plan	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	FY 2022 Base	FY 2022 Programmatic Restoral (WCOSS)	FY 2022 Programmatic Restoral (G550)	POS	FTE	FY 2022 Program Changes	POS	FTE	FY 2022 Estimate
Observations	227,186	(2)	(2)	8,245	(324)	714	708	235,107	4,670	54	0	0	4,391	714	708	244,222
Central Processing	96,727	(2)	(2)	5,688	(346)	224	221	102,069	863	390	0	0	5,150	224	221	108,472
Analyze, Forecast and Support	536,872	(1)	(1)	22,901	(54)	2,929	2,898	559,719	0	128	4	3	5,250	2,933	2,901	565,097
Dissemination	78,344	0	0	2,484	0	78	77	80,828	0	18	0	0	36,800	78	77	117,646
Science and Technology Integration	153,499	0	0	4,810	0	427	421	158,309	1,956	69	19	15	20,814	446	436	181,148
Total, NWS - Discretionary ORF	**1,092,628**	**(5)**	**(5)**	**44,128**	**(724)**	**4,372**	**4,325**	**1,136,032**	**7,489**	**659**	**23**	**18**	**72,405**	**4,395**	**4,343**	**1,216,585**
Total, NWS - Discretionary PAC	133,406	0	0	0	0	26	25	133,406	(29,772)	0	0	0	8,529	26	25	112,163
Discretionary Total - NWS	**1,226,034**	**(5)**	**(5)**	**44,128**	**(724)**	**4,398**	**4,350**	**1,269,438**	**(22,283)**	**659**	**23**	**18**	**80,934**	**4,421**	**4,368**	**1,328,748**

Department of Commerce
National Oceanic and Atmospheric Administration
CONTROL TABLE
(Dollar amounts in thousands)

NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE

Direct Obligations

FY 2022 Proposed Operating Plan	FY 2021 Spend Plan	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	FY 2022 Base	FY 2022 Programmatic Restoral (WCOSS)	FY 2022 Programmatic Restoral (G550)	POS	FTE	FY 2022 Program Changes	POS	FTE	FY 2022 Estimate
Environmental Satellite Observing Systems																
Satellite and Product Operations	187,118	(2)	(2)	5,071	(277)	291	285	191,912	1,715	266	0	0	9,000	291	285	202,893
Product Development, Readiness & Application	28,287	(2)	(2)	1,080	(276)	86	85	29,091	127	20	3	2	20,505	89	87	49,743
Office of Space Commerce	10,000	0	0	0	0	20	11	10,000	0	0	0	0	0	20	11	10,000
U.S. Group on Earth Observations (USGEO)	500	0	0	0	0	0	0	500	0	0	0	0	500	0	0	1,000
Total, Environmental Satellite Observing Systems	**225,905**	**(4)**	**(4)**	**6,151**	**(553)**	**397**	**381**	**231,503**	**1,842**	**286**	**3**	**2**	**30,005**	**400**	**383**	**263,636**
National Centers for Environmental Information																
National Centers for Environmental Information	63,040	0	0	2,086	0	186	172	65,126	423	37	0	0	22,500	186	172	88,086
Total, National Centers for Environmental Information	**63,040**	**0**	**0**	**2,086**	**0**	**186**	**172**	**65,126**	**423**	**37**	**0**	**0**	**22,500**	**186**	**172**	**88,086**
Total, NESDIS - Discretionary ORF	**288,945**	**(4)**	**(4)**	**8,237**	**(553)**	**583**	**553**	**296,629**	**2,265**	**323**	**3**	**2**	**52,505**	**586**	**555**	**351,722**
Total, NESDIS - Discretionary PAC	1,224,924	0	0	0	0	236	229	1,224,924	0	0	22	16	452,395	258	245	1,677,319
Discretionary Total - NESDIS	**1,513,869**	**(4)**	**(4)**	**8,237**	**(553)**	**819**	**782**	**1,521,553**	**2,265**	**323**	**25**	**18**	**504,900**	**844**	**800**	**2,029,041**

Department of Commerce
National Oceanic and Atmospheric Administration
CONTROL TABLE
(Dollar amounts in thousands)

MISSION SUPPORT
Direct Obligations

FY 2022 Proposed Operating Plan	FY 2021 Spend Plan	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	FY 2022 Base	FY 2022 Programmatic Restoral (WCOSS)	FY 2022 Programmatic Restoral (G550)	POS	FTE	FY 2022 Program Changes	POS	FTE	FY 2022 Estimate
Mission Support Services																
Executive Leadership	26,975	0	0	1,402	0	116	110	28,377	0	103	11	9	2,500	127	119	30,980
Mission Services and Management	152,755	(4)	(4)	5,976	2,410	625	594	161,141	2,820	425	64	50	25,000	689	644	189,386
IT Security	15,378	0	0	487	0	20	19	15,865	0	0	0	0	19,500	20	19	35,365
Payment to the DOC Working Capital Fund	66,389	0	0	4,945	(3,467)	0	0	67,867	0	0	0	0	0	0	0	67,867
Facilities Maintenance	5,000	0	0	0	0	0	0	5,000	0	0	0	0	0	0	0	5,000
Total, Mission Support Services	**266,497**	**(4)**	**(4)**	**12,810**	**(1,057)**	**761**	**723**	**278,250**	**2,820**	**528**	**75**	**59**	**47,000**	**836**	**782**	**328,598**
Office of Education																
Office of Education	33,000	0	0	220	0	16	16	33,220	0	0	4	3	7,900	20	19	41,120
Total, Office of Education	**33,000**	**0**	**0**	**220**	**0**	**16**	**16**	**33,220**	**0**	**0**	**4**	**3**	**7,900**	**20**	**19**	**41,120**
Total, MS - Discretionary ORF	**299,497**	**(4)**	**(4)**	**13,030**	**(1,057)**	**777**	**739**	**311,470**	**2,820**	**528**	**79**	**62**	**54,900**	**856**	**801**	**369,718**
Total, MS - Discretionary PAC	43,000	0	0	0	0	1	1	43,000	0	0	0	0	38,000	1	1	81,000
Discretionary Total - MS	**342,497**	**(4)**	**(4)**	**13,030**	**(1,057)**	**778**	**740**	**354,470**	**2,820**	**528**	**79**	**62**	**92,900**	**857**	**802**	**450,718**

Department of Commerce
National Oceanic and Atmospheric Administration
CONTROL TABLE
(Dollar amounts in thousands)

OFFICE OF MARINE AND AVIATION OPERATIONS
Direct Obligations

FY 2022 Proposed Operating Plan	FY 2021 Spend Plan	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	FY 2022 Base	FY 2022 Programmatic Restoral (WCOSS)	FY 2022 Programmatic Restoral (G550)	POS	FTE	FY 2022 Program Changes	POS	FTE	FY 2022 Estimate
Marine Operations and Maintenance	165,926	0	0	6,905	0	628	596	172,831	0	74	21	15	21,069	649	611	193,974
Aviation Operations and Aircraft Services	31,987	0	0	1,139	0	72	72	33,126	0	13	10	7	3,561	82	79	36,700
Autonomous Uncrewed Technology Operations	13,665	0	0	411	0	9	9	14,076	0	0	2	1	1,500	11	10	15,576
NOAA Commissioned Officer Corps	42,000	57	57	666	7,337	345	345	50,003	0	0	10	7	3,370	355	352	53,373
Total, OMAO - Discretionary ORF	**253,578**	**57**	**57**	**9,121**	**7,337**	**1,054**	**1,022**	**270,036**	**0**	**87**	**43**	**30**	**29,500**	**1,097**	**1,052**	**299,623**
Total, OMAO - Discretionary PAC	123,500	0	0	0	0	30	30	123,500	0	(3,500)	0	0	185,500	30	30	305,500
Total, OMAO - Other Discretionary Accounts	1,591	0	0	0	26	0	0	1,617	0	0	0	0	0	0	0	1,617
Discretionary Total - OMAO	**378,669**	**57**	**57**	**9,121**	**7,363**	**1,084**	**1,052**	**395,153**	**0**	**(3,413)**	**43**	**30**	**215,000**	**1,127**	**1,082**	**606,740**
Total, OMAO - Mandatory Accounts	30,770	0	0	0	1,020	0	0	31,790	0	0	0	0	0	0	0	31,790
GRAND TOTAL OMAO	**409,439**	**57**	**57**	**9,121**	**8,383**	**1,084**	**1,052**	**426,943**	**0**	**(3,413)**	**43**	**30**	**215,000**	**1,127**	**1,082**	**638,530**

Department of Commerce
National Oceanic and Atmospheric Administration
CONTROL TABLE
(Dollar amounts in thousands)

ORF SUMMARY

LINE OFFICE DIRECT DISCRETIONARY OBLIGATIONS

FY 2022 Proposed Operating Plan	FY 2021 Spend Plan	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	FY 2022 Base	FY 2022 Programmatic Restoral (WCOSS)	FY 2022 Programmatic Restoral (G550)	POS	FTE	FY 2022 Program Changes	POS	FTE	FY 2022 Estimate
National Ocean Service	613,775	(24)	(24)	13,530	(2,926)	1,266	1,188	624,379	5,180	745	116	87	223,604	1,382	1,275	853,908
National Marine Fisheries Service	954,985	(13)	(13)	31,895	(1,562)	3,117	2,662	985,318	9,051	826	134	102	104,132	3,251	2,764	1,099,327
Office of Oceanic and Atmospheric Research	567,291	(7)	(7)	8,990	(911)	847	819	575,370	2,967	332	63	47	183,500	910	866	762,169
National Weather Service	1,092,628	(5)	(5)	44,128	(724)	4,372	4,325	1,136,032	7,489	659	23	18	72,405	4,395	4,343	1,216,585
National Environmental Satellite, Data and Information Service	288,945	(4)	(4)	8,237	(553)	583	553	296,629	2,265	323	3	2	52,505	586	555	351,722
Mission Support	299,497	(4)	(4)	13,030	(1,057)	777	739	311,470	2,820	528	79	62	54,900	856	801	369,718
Office of Marine and Aviation Operations	253,578	57	57	9,121	7,337	1,054	1,022	270,036	0	87	43	30	29,500	1,097	1,052	299,623
SUBTOTAL LO DIRECT DISCRETIONARY ORF OBLIGATIONS	**4,070,699**	**0**	**0**	**128,931**	**(396)**	**12,016**	**11,308**	**4,199,234**	**29,772**	**3,500**	**461**	**348**	**720,546**	**12,477**	**11,656**	**4,953,052**

Department of Commerce
National Oceanic and Atmospheric Administration
CONTROL TABLE
(Dollar amounts in thousands)

ORF ADJUSTMENTS

FY 2022 Proposed Operating Plan	FY 2021 Spend Plan	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	FY 2022 Base	FY 2022 Programmatic Restoral (WCOSS)	FY 2022 Programmatic Restoral (G550)	POS	FTE	FY 2022 Program Changes	POS	FTE	FY 2022 Estimate
SUBTOTAL ORF DIRECT OBLIGATIONS	**4,070,699**	**0**	**0**	**128,931**	**(396)**	**12,016**	**11,308**	**4,199,234**	**29,772**	**3,500**	**461**	**348**	**720,546**	**12,477**	**11,656**	**4,953,052**
FINANCING																
Deobligations	(17,500)	0	0	0	0	0	0	(17,500)	0	0	0	0	0	0	0	(17,500)
Total ORF Financing	**(17,500)**	**0**	**0**	**0**	**0**	**0**	**0**	**(17,500)**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**(17,500)**
SUBTOTAL ORF BUDGET AUTHORITY	**4,053,199**	**0**	**0**	**128,931**	**(396)**	**12,016**	**11,308**	**4,181,734**	**29,772**	**3,500**	**461**	**348**	**720,546**	**12,477**	**11,656**	**4,935,552**
TRANSFERS																
Transfer from ORF to PAC	33,272	0	0	0	(33,272)	0	0	0	0	0	0	0	0	0	0	0
Transfer from P&D to ORF	(246,171)	0	0	0	0	0	0	(246,171)	0	0	0	0	0	0	0	(246,171)
Total ORF Transfers	**(212,899)**	**0**	**0**	**0**	**(33,272)**	**0**	**0**	**(246,171)**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**(246,171)**
SUBTOTAL ORF APPROPRIATION	**3,840,300**	**0**	**0**	**128,931**	**(33,668)**	**12,016**	**11,308**	**3,935,563**	**29,772**	**3,500**	**461**	**348**	**720,546**	**12,477**	**11,656**	**4,689,381**

Department of Commerce
National Oceanic and Atmospheric Administration
CONTROL TABLE
(Dollar amounts in thousands)

PROCUREMENT, ACQUISITION, AND CONSTRUCTION

Direct Discretionary Obligations

FY 2022 Proposed Operating Plan	FY 2021 Spend Plan	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	FY 2022 Base	FY 2022 Programmatic Restoral (WCOSS)	FY 2022 Programmatic Restoral (G550)	POS	FTE	FY 2022 Program Changes	POS	FTE	FY 2022 Estimate
NOS																
Construction																
National Estuarine Research Reserve Construction	4,500	0	0	0	0	0	0	4,500	0	0	0	0	0	0	0	4,500
Marine Sanctuaries Construction	4,000	0	0	0	0	1	1	4,000	0	0	0	0	0	1	1	4,000
Subtotal, NOS Construction	**8,500**	**0**	**0**	**0**	**0**	**1**	**1**	**8,500**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**8,500**
Total, NOS - PAC	**8,500**	**0**	**0**	**0**	**0**	**1**	**1**	**8,500**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**8,500**
Total, NMFS - PAC	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
OAR																
Systems Acquisition																
Research Supercomputing/ CCRI	43,500	0	0	0	0	1	1	43,500	0	0	0	0	10,000	1	1	53,500
Subtotal, OAR Systems Acquisition	**43,500**	**0**	**0**	**0**	**0**	**1**	**1**	**43,500**	**0**	**0**	**0**	**0**	**10,000**	**1**	**1**	**53,500**
Total, OAR - PAC	**43,500**	**0**	**0**	**0**	**0**	**1**	**1**	**43,500**	**0**	**0**	**0**	**0**	**10,000**	**1**	**1**	**53,500**
NWS																
Systems Acquisition																
Observations	15,700	0	0	0	0	0	0	15,700	0	0	0	0	8,529	0	0	24,229
Central Processing	97,772	0	0	0	0	26	25	97,772	(29,772)	0	0	0	0	26	25	68,000
Dissemination	9,934	0	0	0	0	0	0	9,934	0	0	0	0	0	0	0	9,934
Subtotal, NWS Systems Acquisition	**123,406**	**0**	**0**	**0**	**0**	**26**	**25**	**123,406**	**(29,772)**	**0**	**0**	**0**	**8,529**	**26**	**25**	**102,163**
Construction																
Facilities Construction and Major Repairs	10,000	0	0	0	0	0	0	10,000	0	0	0	0	0	0	0	10,000
Subtotal, NWS Construction	**10,000**	**0**	**0**	**0**	**0**	**0**	**0**	**10,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**10,000**
Total, NWS - PAC	**133,406**	**0**	**0**	**0**	**0**	**26**	**25**	**133,406**	**(29,772)**	**0**	**0**	**0**	**8,529**	**26**	**25**	**112,163**

Department of Commerce
National Oceanic and Atmospheric Administration
CONTROL TABLE
(Dollar amounts in thousands)

PROCUREMENT, ACQUISITION, AND CONSTRUCTION

Direct Discretionary Obligations

FY 2022 Proposed Operating Plan	FY 2021 Spend Plan	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	FY 2022 Base	FY 2022 Programmatic Restoral (WCOSS)	FY 2022 Programmatic Restoral (G550)	POS	FTE	FY 2022 Program Changes	POS	FTE	FY 2022 Estimate
NESDIS																
Systems Acquisition																
Geostationary Systems - R	334,500	(47)	(47)	0	(334,500)	0	0	0	0	0	0	0	0	0	0	0
Polar Weather Satellites	657,835	(89)	(88)	0	(657,835)	0	0	0	0	0	0	0	0	0	0	0
Cooperative Data and Rescue Services (CDARS)	14,400	(4)	(3)	0	(14,400)	0	0	0	0	0	0	0	0	0	0	0
Space Weather Follow On	108,115	(15)	(13)	0	(108,115)	0	0	0	0	0	0	0		0	0	0
COSMIC 2/GNSS RO	5,892	(2)	(2)	0	(5,892)	0	0	0	0	0	0	0	0	0	0	0
Common Ground Services (CGS)	39,287	0	0	0	9,339	35	34	48,626	0	0	0	0	25,007	35	34	73,633
Projects, Planning and Analysis	15,945	(15)	(15)	0	(15,945)	0	0	0	0	0	0	0	0	0	0	0
Geostationary Earth Orbit (GEO)	10,000	47	47	0	334,500	47	47	344,500	0	0	6	4	456,000	53	51	800,500
Low Earth Orbit (LEO)	0	95	93	0	678,127	95	93	678,127	0	0	4	2	(165,397)	99	95	512,730
Space Weather	0	30	28	0	114,721	30	28	114,721	0	0	10	8	93,785	40	36	208,506
Systems/Services Architecture and Engineering (SAE)	38,500	0	0	0	0	29	27	38,500	0	0	2	2	43,000	31	29	81,500
Subtotal, NESDIS Systems Acquisition	**1,224,474**	**0**	**0**	**0**	**0**	**236**	**229**	**1,224,474**	**0**	**0**	**22**	**16**	**452,395**	**258**	**245**	**1,676,869**
Construction																
Satellite CDA Facility	2,450	0	0	0	0	0	0	2,450	0	0	0	0	0	0	0	2,450
Subtotal, NESDIS Construction	**2,450**	**0**	**0**	**0**	**0**	**0**	**0**	**2,450**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2,450**
Transfer to OIG	**(2,000)**	**0**	**0**	**0**	**0**	**0**	**0**	**(2,000)**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**(2,000)**
Total, NESDIS - PAC	**1,224,924**	**0**	**0**	**0**	**0**	**236**	**229**	**1,224,924**	**0**	**0**	**22**	**16**	**452,395**	**258**	**245**	**1,677,319**
Mission Support																
Construction																
NOAA Construction	43,000	0	0	0	0	1	1	43,000	0	0	0	0	38,000	1	1	81,000
Subtotal, Mission Support Construction	**43,000**	**0**	**0**	**0**	**0**	**1**	**1**	**43,000**	**0**	**0**	**0**	**0**	**38,000**	**1**	**1**	**81,000**
Total, Mission Support - PAC	**43,000**	**0**	**0**	**0**	**0**	**1**	**1**	**43,000**	**0**	**0**	**0**	**0**	**38,000**	**1**	**1**	**81,000**
OMAO																
Marine and Aviation Capital Investments																
Platform Capital Improvements & Tech Infusion	25,000	0	0	0	0	13	13	25,000	0	0	0	0	70,500	13	13	95,500
Vessel Recapitalization and Construction	63,500	0	0	0	0	13	13	63,500	0	11,500	0	0	0	13	13	75,000
Aircraft Recapitalization and Construction	35,000	0	0	0	0	4	4	35,000	0	(15,000)	0	0	115,000	4	4	135,000
Subtotal, Marine and Aviation Capital Investments	**123,500**	**0**	**0**	**0**	**0**	**30**	**30**	**123,500**	**0**	**(3,500)**	**0**	**0**	**185,500**	**30**	**30**	**305,500**
Total, OMAO - PAC	**123,500**	**0**	**0**	**0**	**0**	**30**	**30**	**123,500**	**0**	**(3,500)**	**0**	**0**	**185,500**	**30**	**30**	**305,500**
GRAND TOTAL PAC DISCRETIONARY OBLIGATIONS	**1,576,830**	**0**	**0**	**0**	**0**	**295**	**287**	**1,576,830**	**(29,772)**	**(3,500)**	**22**	**16**	**694,424**	**317**	**303**	**2,237,982**

Department of Commerce
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CONTROL TABLE
(Dollar amounts in thousands)

PAC ADJUSTMENTS

FY 2022 Proposed Operating Plan	FY 2021 Spend Plan	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	FY 2022 Base	FY 2022 Programmatic Restoral (WCOSS)	FY 2022 Programmatic Restoral (G550)	POS	FTE	FY 2022 Program Changes	POS	FTE	FY 2022 Estimate
SUBTOTAL PAC DIRECT OBLIGATIONS	**1,576,830**	**0**	**0**	**0**	**0**	**295**	**287**	**1,576,830**	**(29,772)**	**(3,500)**	**22**	**16**	**694,424**	**317**	**303**	**2,237,982**
FINANCING																
Deobligations	(13,000)	0	0	0	0	0	0	(13,000)	0	0	0	0	0	0	0	(13,000)
Unobligated balance, Rescission	0	0	0	0	(39,250)	0	0	(39,250)	0	0	0	0	0	0	0	(39,250)
Total PAC Financing	**(13,000)**	**0**	**0**	**0**	**(39,250)**	**0**	**0**	**(52,250)**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**(52,250)**
SUBTOTAL PAC BUDGET AUTHORITY	**1,563,830**	**0**	**0**	**0**	**(39,250)**	**295**	**287**	**1,524,580**	**(29,772)**	**(3,500)**	**22**	**16**	**694,424**	**317**	**303**	**2,185,732**
TRANSFERS																
Transfer from ORF to PAC	(33,272)	0	0	0	33,272	0	0	0	0	0	0	0	0	0	0	0
Transfer to OIG	2,000	0	0	0	0	0	0	2,000	0	0	0	0	0	0	0	2,000
Unobligated balance, Rescission	0	0	0	0	39,250	0	0	39,250	0	0	0	0	0	0	0	39,250
Total PAC Transfers	**(31,272)**	**0**	**0**	**0**	**72,522**	**0**	**0**	**41,250**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**41,250**
SUBTOTAL PAC APPROPRIATION	**1,532,558**	**0**	**0**	**0**	**33,272**	**295**	**287**	**1,565,830**	**(29,772)**	**(3,500)**	**22**	**16**	**694,424**	**317**	**303**	**2,226,982**

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OTHER ACCOUNTS DISCRETIONARY

FY 2022 Proposed Operating Plan	FY 2021 Spend Plan	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	FY 2022 Base	FY 2022 Programmatic Restoral (WCOSS)	FY 2022 Programmatic Restoral (G550)	POS	FTE	FY 2022 Program Changes	POS	FTE	FY 2022 Estimate
NMFS																
Fishermen's Contingency Fund Obligations	349	0	0	0	0	0	0	349	0	0	0	0	0	0	0	349
Fishermen's Contingency Fund Budget Authority	349	0	0	0	0	0	0	349	0	0	0	0	0	0	0	349
Fishermen's Contingency Fund Appropriations	349	0	0	0	0	0	0	349	0	0	0	0	0	0	0	349
Promote and Develop Fisheries Obligations	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Promote and Develop Fisheries Budget Authority	(246,171)	0	0	0	0	0	0	(246,171)	0	0	0	0	0	0	0	(246,171)
Promote and Develop Fisheries Appropriation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pacific Coastal Salmon Recovery Fund Obligations	65,000	0	0	0	0	2	2	65,000	0	0	0	0	0	2	2	65,000
Pacific Coastal Salmon Recovery Fund Budget Authority	65,000	0	0	0	0	2	2	65,000	0	0	0	0	0	2	2	65,000
Pacific Coastal Salmon Recovery Fund Appropriation	65,000	0	0	0	0	2	2	65,000	0	0	0	0	0	2	2	65,000
Marine Mammal Unusual Mortality Event Fund Obligations	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marine Mammal Unusual Mortality Event Fund Budget Authority	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marine Mammal Unusual Mortality Event Fund Appropriation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fisheries Disaster Assistance Fund Obligations	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fisheries Disaster Assistance Fund Budget Authority	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fisheries Disaster Assistance Fund Appropriation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal, NMFS Other Discretionary Direct Obligations	**65,349**	**0**	**0**	**0**	**0**	**2**	**2**	**65,349**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**65,349**
Subtotal, NMFS Other Discretionary Budget Authority	**(180,822)**	**0**	**0**	**0**	**0**	**2**	**2**	**(180,822)**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**(180,822)**
Subtotal, NMFS Other Discretionary Appropriation	**65,349**	**0**	**0**	**0**	**0**	**2**	**2**	**65,349**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**65,349**
OMAO																
Medicare Eligible Retiree Healthcare Fund Obligations	1,591	0	0	0	26	0	0	1,617	0	0	0	0	0	0	0	1,617
Medicare Eligible Retiree Healthcare Fund Budget Authority	1,591	0	0	0	26	0	0	1,617	0	0	0	0	0	0	0	1,617
Medicare Eligible Retiree Healthcare Fund Appropriation	1,591	0	0	0	26	0	0	1,617	0	0	0	0	0	0	0	1,617
Subtotal, OMAO Other Discretionary Direct Obligations	**1,591**	**0**	**0**	**0**	**26**	**0**	**0**	**1,617**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1,617**
Subtotal, OMAO Other Discretionary Budget Authority	**1,591**	**0**	**0**	**0**	**26**	**0**	**0**	**1,617**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1,617**
Subtotal, OMAO Other Discretionary Appropriation	**1,591**	**0**	**0**	**0**	**26**	**0**	**0**	**1,617**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1,617**
TOTAL, OTHER DISCRETIONARY DIRECT OBLIGATIONS	**66,940**	**0**	**0**	**0**	**26**	**2**	**2**	**66,966**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**66,966**
TOTAL, OTHER DISCRETIONARY BUDGET AUTHORITY	**(179,231)**	**0**	**0**	**0**	**26**	**2**	**2**	**(179,205)**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**(179,205)**
TOTAL, OTHER DISCRETIONARY APPROPRIATION	**66,940**	**0**	**0**	**0**	**26**	**2**	**2**	**66,966**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**66,966**

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GRAND TOTAL SUMMARY DISCRETIONARY APPROPRIATIONS

FY 2022 Proposed Operating Plan	FY 2021 Spend Plan	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	FY 2022 Base	FY 2022 Programmatic Restoral (WCOSS)	FY 2022 Programmatic Restoral (G550)	POS	FTE	FY 2022 Program Changes	POS	FTE	FY 2022 Estimate
Operations, Research, and Facilities	3,840,300	0	0	128,931	(33,668)	12,016	11,308	3,935,563	29,772	3,500	461	348	720,546	12,477	11,656	4,689,381
Procurement, Acquisition, and Construction	1,532,558	0	0	0	33,272	295	287	1,565,830	(29,772)	(3,500)	22	16	694,424	317	303	2,226,982
Fisherman's Contingency Fund	349	0	0	0	0	0	0	349	0	0	0	0	0	0	0	349
Pacific Coastal Salmon Recovery Fund	65,000	0	0	0	0	2	2	65,000	0	0	0	0	0	2	2	65,000
Fisheries Disaster Assistance Fund	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marine Mammal Unusual Mortality Event Fund	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Medicare Eligible Retiree Health Care Fund	1,591	0	0	0	26	0	0	1,617	0	0	0	0	0	0	0	1,617
GRAND TOTAL DISCRETIONARY APPROPRIATION	**5,439,798**	**0**	**0**	**128,931**	**(370)**	**12,313**	**11,597**	**5,568,359**	**0**	**0**	**483**	**364**	**1,414,970**	**12,796**	**11,961**	**6,983,329**

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SUMMARY OF DISCRETIONARY RESOURCES

FY 2022 Proposed Operating Plan	FY 2021 Spend Plan	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	FY 2022 Base	FY 2022 Programmatic Restoral (WCOSS)	FY 2022 Programmatic Restoral (G550)	POS	FTE	FY 2022 Program Changes	POS	FTE	FY 2022 Estimate
Direct Discretionary Obligations																
ORF Direct Obligations	4,070,699	0	0	128,931	(396)	12,016	11,308	4,199,234	29,772	3,500	461	348	720,546	12,477	11,656	4,953,052
PAC Direct Obligations	1,576,830	0	0	0	0	295	287	1,576,830	(29,772)	(3,500)	22	16	694,424	317	303	2,237,982
OTHER Direct Obligations	66,940	0	0	0	26	2	2	66,966	0	0	0	0	0	2	2	66,966
TOTAL Direct Discretionary Obligations	**5,714,469**	**0**	**0**	**128,931**	**(370)**	**12,313**	**11,597**	**5,843,030**	**0**	**0**	**483**	**364**	**1,414,970**	**12,796**	**11,961**	**7,258,000**
Discretionary Budget Authority																
ORF Budget Authority	4,053,199	0	0	128,931	(396)	12,016	11,308	4,181,734	29,772	3,500	461	348	720,546	12,477	11,656	4,935,552
PAC Budget Authority	1,563,830	0	0	0	(39,250)	295	287	1,524,580	(29,772)	(3,500)	22	16	694,424	317	303	2,185,732
OTHER Budget Authority	(179,231)	0	0	0	26	2	2	(179,205)	0	0	0	0	0	2	2	(179,205)
TOTAL Discretionary Budget Authority	**5,437,798**	**0**	**0**	**128,931**	**(39,620)**	**12,313**	**11,597**	**5,527,109**	**0**	**0**	**483**	**364**	**1,414,970**	**12,796**	**11,961**	**6,942,079**
Discretionary Appropriations																
ORF Appropriation	3,840,300	0	0	128,931	(33,668)	12,016	11,308	3,935,563	29,772	3,500	461	348	720,546	12,477	11,656	4,689,381
PAC Appropriation	1,532,558	0	0	0	33,272	295	287	1,565,830	(29,772)	(3,500)	22	16	694,424	317	303	2,226,982
OTHER Appropriation	66,940	0	0	0	26	2	2	66,966	0	0	0	0	0	2	2	66,966
TOTAL Discretionary Appropriation	**5,439,798**	**0**	**0**	**128,931**	**(370)**	**12,313**	**11,597**	**5,568,359**	**0**	**0**	**483**	**364**	**1,414,970**	**12,796**	**11,961**	**6,983,329**

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OTHER ACCOUNTS MANDATORY

FY 2022 Proposed Operating Plan	FY 2021 Spend Plan	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	FY 2022 Base	FY 2022 Programmatic Restoral (WCOSS)	FY 2022 Programmatic Restoral (G550)	POS	FTE	FY 2022 Program Changes	POS	FTE	FY 2022 Estimate
NOS																
Damage Assessment and Restoration Revolving Fund Obligations	71,155	0	0	0	(55,155)	30	30	16,000	0	0	0	0	0	30	30	16,000
Damage Assessment and Restoration Revolving Fund Budget Authority	5,855	0	0	0	145	30	30	6,000	0	0	0	0	0	30	30	6,000
Damage Assessment and Restoration Revolving Fund Appropriation	0	0	0	0	0	30	30	0	0	0	0	0	0	30	30	0
Sanctuaries Enforcement Asset Forfeiture Fund Obligations	120	0	0	0	0	0	0	120	0	0	0	0	0	0	0	120
Sanctuaries Enforcement Asset Forfeiture Fund Budget Authority	114	0	0	0	6	0	0	120	0	0	0	0	0	0	0	120
Sanctuaries Enforcement Asset Forfeiture Fund Appropriation	120	0	0	0	0	0	0	120	0	0	0	0	0	0	0	120
Gulf Coast Ecosystem Restoration Fund Obligations	6,027	0	0	0	73	2	2	6,100	0	0	0	0	0	2	2	6,100
Gulf Coast Ecosystem Restoration Fund Budget Authority	0	0	0	0	0	2	2	0	0	0	0	0	0	2	2	0
Gulf Coast Ecosystem Restoration Fund Appropriation	0	0	0	0	0	2	2	0	0	0	0	0	0	2	2	0
Subtotal, NOS Other Mandatory Direct Obligations	**77,302**	**0**	**0**	**0**	**(55,082)**	**32**	**32**	**22,220**	**0**	**0**	**0**	**0**	**0**	**32**	**32**	**22,220**
Subtotal, NOS Other Mandatory Budget Authority	**5,969**	**0**	**0**	**0**	**151**	**32**	**32**	**6,120**	**0**	**0**	**0**	**0**	**0**	**32**	**32**	**6,120**
Subtotal, NOS Other Mandatory Appropriation	**120**	**0**	**0**	**0**	**0**	**32**	**32**	**120**	**0**	**0**	**0**	**0**	**0**	**32**	**32**	**120**
NMFS																
Promote and Develop Fisheries Obligations	12,000	0	0	0	(4,011)	0	0	7,989	0	0	0	0	0	0	0	7,989
Promote and Develop Fisheries Budget Authority	258,171	0	0	0	(4,011)	0	0	254,160	0	0	0	0	0	0	0	254,160
Promote and Develop Fisheries Appropriation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fisheries Finance Program Account Obligations	3,564	0	0	0	(3,564)	0	0	0	0	0	0	0	0	0	0	0
Fisheries Finance Program Account Budget Authority	3,564	0	0	0	(3,564)	0	0	0	0	0	0	0	0	0	0	0
Fisheries Finance Program Account Appropriation	3,564	0	0	0	(3,564)	0	0	0	0	0	0	0	0	0	0	0
Environmental Improvement & Restoration Fund Obligations	6,289	0	0	0	(3,381)	0	0	2,908	0	0	0	0	0	0	0	2,908
Environmental Improvement & Restoration Fund Budget Authority	6,289	0	0	0	(3,381)	0	0	2,908	0	0	0	0	0	0	0	2,908
Environmental Improvement & Restoration Fund Appropriation	6,669	0	0	0	(3,585)	0	0	3,084	0	0	0	0	0	0	0	3,084
Limited Access System Administration Fund Obligations	13,477	0	0	0	202	40	27	13,679	0	0	0	0	0	40	27	13,679
Limited Access System Administration Fund Budget Authority	13,477	0	0	0	202	40	27	13,679	0	0	0	0	0	40	27	13,679
Limited Access System Administration Fund Appropriation	13,455	0	0	0	237	40	27	13,692	0	0	0	0	0	40	27	13,692
Western Pacific Sustainable Fisheries Fund Obligations	493	0	0	0	102	0	0	595	0	0	0	0	0	0	0	595
Western Pacific Sustainable Fisheries Fund Budget Authority	493	0	0	0	102	0	0	595	0	0	0	0	0	0	0	595
Western Pacific Sustainable Fisheries Fund Appropriation	500	0	0	0	100	0	0	600	0	0	0	0	0	0	0	600

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OTHER ACCOUNTS MANDATORY

FY 2022 Proposed Operating Plan	FY 2021 Spend Plan	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	FY 2022 Base	FY 2022 Programmatic Restoral (WCOSS)	FY 2022 Programmatic Restoral (G550)	POS	FTE	FY 2022 Program Changes	POS	FTE	FY 2022 Estimate
Fisheries Enforcement Asset Forfeiture Fund Obligations	3,594	0	0	0	102	0	0	3,696	0	0	0	0	0	0	0	3,696
Fisheries Enforcement Asset Forfeiture Fund Budget Authority	3,594	0	0	0	102	0	0	3,696	0	0	0	0	0	0	0	3,696
Fisheries Enforcement Asset Forfeiture Fund Appropriation	3,696	0	0	0	0	0	0	3,696	0	0	0	0	0	0	0	3,696
North Pacific Observer Fund Obligations	2,528	0	0	0	1,387	0	0	3,915	0	0	0	0	0	0	0	3,915
North Pacific Observer Fund Budget Authority	2,528	0	0	0	1,387	0	0	3,915	0	0	0	0	0	0	0	3,915
North Pacific Observer Fund Appropriation	2,500	0	0	0	1,500	0	0	4,000	0	0	0	0	0	0	0	4,000
Subtotal, NMFS Other Mandatory Direct Obligations	**41,945**	**0**	**0**	**0**	**(9,163)**	**40**	**27**	**32,782**	**0**	**0**	**0**	**0**	**0**	**40**	**27**	**32,782**
Subtotal, NMFS Other Mandatory Budget Authority	**288,116**	**0**	**0**	**0**	**(9,163)**	**40**	**27**	**278,953**	**0**	**0**	**0**	**0**	**0**	**40**	**27**	**278,953**
Subtotal, NMFS Other Mandatory Appropriation	**30,384**	**0**	**0**	**0**	**(5,312)**	**40**	**27**	**25,072**	**0**	**0**	**0**	**0**	**0**	**40**	**27**	**25,072**
OMAO																
NOAA Corps Commissioned Officers Retirement Obligations	30,770	0	0	0	1,020	0	0	31,790	0	0	0	0	0	0	0	31,790
NOAA Corps Commissioned Officers Retirement Budget Authority	30,770	0	0	0	1,020	0	0	31,790	0	0	0	0	0	0	0	31,790
NOAA Corps Commissioned Officers Retirement Appropriation	30,770	0	0	0	1,020	0	0	31,790	0	0	0	0	0	0	0	31,790
Subtotal, OMAO Other Mandatory Direct Obligations	**30,770**	**0**	**0**	**0**	**1,020**	**0**	**0**	**31,790**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**31,790**
Subtotal, OMAO Other Mandatory Budget Authority	**30,770**	**0**	**0**	**0**	**1,020**	**0**	**0**	**31,790**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**31,790**
Subtotal, OMAO Other Mandatory Appropriation	**30,770**	**0**	**0**	**0**	**1,020**	**0**	**0**	**31,790**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**31,790**
TOTAL, OTHER MANDATORY DIRECT OBLIGATIONS	**150,017**	**0**	**0**	**0**	**(63,225)**	**72**	**59**	**86,792**	**0**	**0**	**0**	**0**	**0**	**72**	**59**	**86,792**
TOTAL, OTHER MANDATORY BUDGET AUTHORITY	**324,855**	**0**	**0**	**0**	**(7,992)**	**72**	**59**	**316,863**	**0**	**0**	**0**	**0**	**0**	**72**	**59**	**316,863**
TOTAL, OTHER MANDATORY APPROPRIATION	**61,274**	**0**	**0**	**0**	**(4,292)**	**72**	**59**	**56,982**	**0**	**0**	**0**	**0**	**0**	**72**	**59**	**56,982**

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NOAA SUMMARY

FY 2022 Proposed Operating Plan	FY 2021 Spend Plan	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	FY 2022 Base	FY 2022 Programmatic Restoral (WCOSS)	FY 2022 Programmatic Restoral (G550)	POS	FTE	FY 2022 Program Changes	POS	FTE	FY 2022 Estimate
TOTAL Direct Obligations (Discretionary & Mandatory)	5,864,486	0	0	128,931	(63,595)	12,385	11,656	5,929,822	0	0	483	364	1,414,970	12,868	12,020	7,344,792
TOTAL Budget Authority (Discretionary & Mandatory)	5,762,653	0	0	128,931	(47,612)	12,385	11,656	5,843,972	0	0	483	364	1,414,970	12,868	12,020	7,258,942
TOTAL Appropriation (Discretionary & Mandatory)	5,501,072	0	0	128,931	(4,662)	12,385	11,656	5,625,341	0	0	483	364	1,414,970	12,868	12,020	7,040,311
Reimbursable Financing	361,294	0	0	0	(119,294)	495	469	242,000	0	0	0	0	0	495	469	242,000
TOTAL OBLIGATIONS (Direct & Reimbursable)	**6,225,780**	**0**	**0**	**128,931**	**(182,889)**	**12,880**	**12,125**	**6,171,822**	**0**	**0**	**483**	**364**	**1,414,970**	**13,363**	**12,489**	**7,586,792**
Offsetting Receipts	(10,352)	0	0	0	(7,300)	0	0	(17,652)	0	0	0	0	0	0	0	(17,652)
TOTAL OBLIGATIONS (Direct, Reimbursable & Offsetting Receipts)	**6,215,428**	**0**	**0**	**128,931**	**(190,189)**	**12,880**	**12,125**	**6,154,170**	**0**	**0**	**483**	**364**	**1,414,970**	**13,363**	**12,489**	**7,569,140**

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LINE OFFICE SUMMARY

FY 2022 Proposed Operating Plan	FY 2021 Spend Plan	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	FY 2022 Base	FY 2022 Programmatic Restoral (WCOSS)	FY 2022 Programmatic Restoral (G550)	POS	FTE	FY 2022 Program Changes	POS	FTE	FY 2022 Estimate
National Ocean Service																
ORF	613,775	(24)	(24)	13,530	(2,926)	1,266	1,188	624,379	5,180	745	116	87	223,604	1,382	1,275	853,908
PAC	8,500	0	0	0	0	1	1	8,500	0	0	0	0	0	1	1	8,500
OTHER	77,302	0	0	0	(55,082)	32	32	22,220	0	0	0	0	0	32	32	22,220
TOTAL, NOS	699,577	(24)	(24)	13,530	(58,008)	1,299	1,221	655,099	5,180	745	116	87	223,604	1,415	1,308	884,628
National Marine Fisheries Service																
ORF	954,985	(13)	(13)	31,895	(1,562)	3,117	2,662	985,318	9,051	826	134	102	104,132	3,251	2,764	1,099,327
PAC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	107,294	0	0	0	(9,163)	42	29	98,131	0	0	0	0	0	42	29	98,131
TOTAL, NMFS	1,062,279	(13)	(13)	31,895	(10,725)	3,159	2,691	1,083,449	9,051	826	134	102	104,132	3,293	2,793	1,197,458
Oceanic and Atmospheric Research																
ORF	567,291	(7)	(7)	8,990	(911)	847	819	575,370	2,967	332	63	47	183,500	910	866	762,169
PAC	43,500	0	0	0	0	1	1	43,500	0	0	0	0	10,000	1	1	53,500
TOTAL, OAR	610,791	(7)	(7)	8,990	(911)	848	820	618,870	2,967	332	63	47	193,500	911	867	815,669
National Weather Service																
ORF	1,092,628	(5)	(5)	44,128	(724)	4,372	4,325	1,136,032	7,489	659	23	18	72,405	4,395	4,343	1,216,585
PAC	133,406	0	0	0	0	26	25	133,406	(29,772)	0	0	0	8,529	26	25	112,163
TOTAL, NWS	1,226,034	(5)	(5)	44,128	(724)	4,398	4,350	1,269,438	(22,283)	659	23	18	80,934	4,421	4,368	1,328,748
National Environmental Satellite, Data and Information Service																
ORF	288,945	(4)	(4)	8,237	(553)	583	553	296,629	2,265	323	3	2	52,505	586	555	351,722
PAC	1,224,924	0	0	0	0	236	229	1,224,924	0	0	22	16	452,395	258	245	1,677,319
TOTAL, NESDIS	1,513,869	(4)	(4)	8,237	(553)	819	782	1,521,553	2,265	323	25	18	504,900	844	800	2,029,041
Mission Support																
ORF	299,497	(4)	(4)	13,030	(1,057)	777	739	311,470	2,820	528	79	62	54,900	856	801	369,718
PAC	43,000	0	0	0	0	1	1	43,000	0	0	0	0	38,000	1	1	81,000
Total, Mission Support	342,497	(4)	(4)	13,030	(1,057)	778	740	354,470	2,820	528	79	62	92,900	857	802	450,718
Office of Marine and Aviation Operations																
ORF	253,578	57	57	9,121	7,337	1,054	1,022	270,036	0	87	43	30	29,500	1,097	1,052	299,623
PAC	123,500	0	0	0	0	30	30	123,500	0	(3,500)	0	0	185,500	30	30	305,500
OTHER	32,361	0	0	0	1,046	0	0	33,407	0	0	0	0	0	0	0	33,407
TOTAL, OMAO	409,439	57	57	9,121	8,383	1,084	1,052	426,943	0	(3,413)	43	30	215,000	1,127	1,082	638,530
DIRECT DISCRETIONARY OBLIGATIONS																
ORF	4,070,699	0	0	128,931	(396)	12,016	11,308	4,199,234	29,772	3,500	461	348	720,546	12,477	11,656	4,953,052
PAC	1,576,830	0	0	0	0	295	287	1,576,830	(29,772)	(3,500)	22	16	694,424	317	303	2,237,982
OTHER	216,957	0	0	0	(63,199)	74	61	153,758	0	0	0	0	0	74	61	153,758
TOTAL, DIRECT DISCRETIONARY OBLIGATIONS	**5,864,486**	**0**	**0**	**128,931**	**(63,595)**	**12,385**	**11,656**	**5,929,822**	**0**	**0**	**483**	**364**	**1,414,970**	**12,868**	**12,020**	**7,344,792**
ORF Adjustments (Deobligations/Rescissions)	(17,500)	0	0	0	0	0	0	(17,500)	0	0	0	0	0	0	0	(17,500)
ORF Transfers	(212,899)	0	0	0	(33,272)	0	0	(246,171)	0	0	0	0	0	0	0	(246,171)
PAC Adjustments (Deobligations/Rescissions)	(13,000)	0	0	0	(39,250)	0	0	(52,250)	0	0	0	0	0	0	0	(52,250)
PAC Transfers	(31,272)	0	0	0	72,522	0	0	41,250	0	0	0	0	0	0	0	41,250
OTHER Discretionary Adjustments	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mandatory Accounts Excluded	(150,017)	0	0	0	63,225	(72)	(59)	(86,792)	0	0	0	0	0	(72)	(59)	(86,792)
TOTAL, DISCRETIONARY APPROPRIATIONS	**5,439,798**	**0**	**0**	**128,931**	**(370)**	**12,313**	**11,597**	**5,568,359**	**0**	**0**	**483**	**364**	**1,414,970**	**12,796**	**11,961**	**6,983,329**

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Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
Enacted, 2021	12,016	11,308	4,053,199	4,070,699
Plus: Inflationary adjustments to base	0	0	128,931	128,931
Plus: Technical adjustments to base	0	0	(396)	(396)
2022 Base	12,016	11,308	4,181,734	4,199,234
Plus: Programmatic Restoral	0	0	33,272	33,272
Plus: 2022 Program Changes	461	348	720,546	720,546
2022 Estimate	12,477	11,656	4,935,552	4,953,052

Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

Comparison by program		2020 Actual Personnel	2020 Actual Amount	2021 Enacted Personnel	2021 Enacted Amount	2022 Base Personnel	2022 Base Amount	2022 Estimate Personnel	2022 Estimate Amount	Increase/Decrease from 2022 Base Personnel	Increase/Decrease from 2022 Base Amount
National Ocean Service	Pos/BA	1,149	605,586	1,290	613,775	1,266	624,379	1,382	853,908	116	229,529
	FTE/Obl	1,112	696,147	1,212	613,775	1,188	624,379	1,273	853,908	85	229,529
National Marine Fisheries Service	Pos/BA	2,861	951,799	3,130	954,985	3,117	985,318	3,251	1,099,327	134	114,009
	FTE/Obl	2,656	972,036	2,675	954,985	2,662	985,318	2,764	1,099,327	102	114,009
Oceanic and Atmospheric Research	Pos/BA	736	546,949	854	567,291	847	575,370	910	762,169	63	186,799
	FTE/Obl	681	544,500	826	567,291	819	575,370	866	762,169	47	186,799
National Weather Service	Pos/BA	4,291	1,068,782	4,377	1,092,628	4,372	1,136,032	4,395	1,216,585	23	80,553
	FTE/Obl	4,233	1,099,764	4,330	1,092,628	4,325	1,136,032	4,343	1,216,585	18	80,553
National Environmental Satellite, Data, & Info Service	Pos/BA	537	259,040	587	288,945	583	296,629	586	351,722	3	55,093
	FTE/Obl	507	267,301	557	288,945	553	296,629	555	351,722	2	55,093
Mission Support	Pos/BA	650	298,576	781	299,497	777	311,470	856	369,718	79	58,248
	FTE/Obl	677	295,627	743	299,497	739	311,470	803	369,718	64	58,248
Office of Marine & Aviation Operations	Pos/BA	846	244,877	997	253,578	1,054	270,036	1,097	299,623	43	29,587
	FTE/Obl	943	251,518	965	253,578	1,022	270,036	1,052	299,623	30	29,587
ORF Financing	Pos/BA	0	0	0	(17,500)	0	(17,500)	0	(17,500)	0	0
	FTE/Obl	0	0	0	0	0	0	0	0	0	0
Total	Pos/BA	11,070	3,975,609	12,016	4,053,199	12,016	4,181,734	12,477	4,935,552	461	753,818
	FTE/Obl	10,809	4,126,893	11,308	4,070,699	11,308	4,199,234	11,656	4,953,052	348	753,818

Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/Decrease from 2022 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	10,809	4,126,893	11,308	4,070,699	11,308	4,199,234	11,656	4,953,052	348	753,818
Total Obligations	**10,809**	**4,126,893**	**11,308**	**4,070,699**	**11,308**	**4,199,234**	**11,656**	**4,953,052**	**348**	**753,818**
Adjustments to Obligations:										
Deobligations	0	(42,699)	0	0	0	0	0	0	0	0
Unobligated Balance, SOY	0	(294,587)	0	(17,500)	0	(17,500)	0	(17,500)	0	0
Unobligated Balance, Expiring	0	3,153	0	0	0	0	0	0	0	0
Unobligated Balance, EOY	0	185,182	0	0	0	0	0	0	0	0
Unobligated Balance, Transferred	0	(2,527)	0	0	0	0	0	0	0	0
Unobligated Balance, not apportioned	0	260	0	0	0	0	0	0	0	0
Recission	0	(66)	0	0	0	0	0	0	0	0
Total Budget Authority	**10,809**	**3,975,609**	**11,308**	**4,053,199**	**11,308**	**4,181,734**	**11,656**	**4,935,552**	**348**	**753,818**
Financing from Transfers and Other:										
Transfer from ORF to PAC	0	1,000	0	33,272	0	0	0	0	0	0
Transfer from PAC to ORF	0	(1,531)	0	0	0	0	0	0	0	0
Transfer from P&D to ORF	0	(174,774)	0	(246,171)	0	(246,171)	0	(246,171)	0	0
Transfer from PCSRF to ORF	0	(65)	0	0	0	0	0	0	0	0
Transfer from FDAF to ORF	0	(300)	0	0	0	0	0	0	0	0
Net Appropriation	**10,809**	**3,799,939**	**11,308**	**3,840,300**	**11,308**	**3,935,563**	**11,656**	**4,689,381**	**348**	**753,818**

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Exhibit 6

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
SUMMARY OF REIMBURSABLE OBLIGATIONS
(Dollar Amounts in Thousands)

Comparison by program		2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
National Ocean Service	Pos./BA	10	24,000	11	27,199	11	24,000	11	24,000	0	0
	FTE/Obl	10	19,487	10	39,140	10	24,000	10	24,000	0	0
National Marine Fisheries Service	Pos./BA	199	95,000	257	114,131	257	95,000	257	95,000	0	0
	FTE/Obl	233	79,143	233	148,311	233	95,000	233	95,000	0	0
Oceanic and Atmospheric Research	Pos./BA	16	50,000	22	95,460	22	50,000	22	50,000	0	0
	FTE/Obl	16	49,369	22	135,607	22	50,000	22	50,000	0	0
National Weather Service	Pos./BA	147	44,000	159	77,605	159	44,000	159	44,000	0	0
	FTE/Obl	170	64,716	159	117,940	159	44,000	159	44,000	0	0
National Environmental Satellite, Data, and Information Service	Pos./BA	25	15,000	26	29,939	26	15,000	26	15,000	0	0
	FTE/Obl	29	47,536	25	59,939	25	15,000	25	15,000	0	0
Mission Support	Pos./BA	19	12,000	20	15,684	20	12,000	20	12,000	0	0
	FTE/Obl	20	36,958	20	21,608	20	12,000	20	12,000	0	0
Office of Marine and Aviation Operations	Pos./BA	0	2,000	0	1,276	0	2,000	0	2,000	0	0
	FTE/Obl	0	287	0	16,667	0	2,000	0	2,000	0	0
NOAA Wide Support Services	Pos./BA	0	0	0	0						
	FTE/Obl	0	1,386	0	0						
Total	Pos./BA	416	242,000	495	361,294	495	242,000	495	242,000	0	0
	FTE/Obl	478	298,882	469	539,212	469	242,000	469	242,000	0	0

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Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
SUMMARY OF FINANCING
(Dollar amounts in thousands)

	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
Direct Discretionary Obligation	4,126,893	4,070,699	4,199,234	4,953,052	753,818
Direct Mandatory Obligation	33,410	46,517	41,607	41,607	0
Reimbursable Obligation	298,882	242,000	242,000	242,000	0
Total Obligations	**4,459,185**	**4,359,216**	**4,482,841**	**5,236,659**	**753,818**
Adjustments and Obligations:					
Federal funds	(213,318)	(194,760)	(194,760)	(194,760)	0
Non-Federal Sources	(46,476)	(47,240)	(47,240)	(47,240)	0
Change Uncollected Customer Pmts from Fed.	(46,092)	0	0	0	0
Returned to Treasury	0	0	0	0	0
Deobligation/Recoveries	(43,241)	(17,500)	(17,500)	(17,500)	0
Unobligated balance adjusted, SOY (Direct Disc.)	(294,587)	(185,182)	(185,182)	(185,182)	0
Unobligated balance, Expiring	3,153	0	0	0	0
Unobligated balance, EOY (Direct Disc.)	185,182	185,182	185,182	185,182	
Unobligated balance adjusted, SOY (Mand.)	(42,496)	(39,376)	(23,629)	(23,629)	0
Unobligated balance, transferred to other accounts	(2,527)	0	0	0	0
Unobligated balance, EOY (Mand.)	39,730	23,629	13,812	13,812	0
Unobligated balance, not apportioned	260	0	0	0	0
Unobligated balance, SOY Reimbursable	(114,936)	0	0	0	0
Unobligated balance, EOY Reimbursable	121,874	0	0	0	0
Rescission	0	0	0	0	0
Total Budget Authority	**4,005,711**	**4,083,969**	**4,213,524**	**4,967,342**	**753,818**
Financing from Tranfers and Other:					
Transfer from ORF to PAC	1,000	33,272	0	0	
Transfer from PAC to ORF	(1,531)	0	0	0	
Transfer from P&D to ORF	(174,774)	(246,171)	(246,171)	(246,171)	0
Transfer from PCSRF to ORF	(65)	0	0	0	0
NOAA Corps Retirement Pay (Mand)	(30,102)	(30,770)	(31,790)	(31,790)	0
Spectrum Relocation Fund (Mand)	0	0	0	0	0
Transfer from FDAF to ORF	(300)	0	0	0	0
Net Appropriation	**3,799,939**	**3,840,300**	**3,935,563**	**4,689,381**	**753,818**

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Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
ADJUSTMENTS TO BASE
(Dollar amounts in thousands)

	FTE	Amount
Transfer		(396)
Adjustment		17,500
Financing		(17,500)
Other Changes		
2021 Pay raise		3,792
2022 Pay raise		33,059
Awards		0
Full-year cost in 2022 of positions financed for part-year in 2021	0	0
Change in compensable days		0
Civil Service Retirement System (CSRS)		669
Federal Employee Retirement System (FERS)		10,695
Thrift Savings Plan		31,899
Federal Insurance Contribution Act (FICA) - OASDI		(453)
Health Insurance		2,808
Employees Compensation Fund		(123)
Travel:		
Mileage		(15)
Per Diem		0
Rental payments to GSA		5,159
GSA Furniture and IT (FIT) Program		273
Working Capital Fund, Departmental Management		3,729
NARA Storage & Maintenance		(61)
General Pricing Level Adjustment		22,295
Continuous Diagnostics and Mitigation (CDM) Charges		1,216
Enterprise Services		10,478
HCHB Utilities		0
Commerce Business System		282
Federal Protective Service		(2)
Grants		1,316
Ship and Aircraft Fuel Costs		1,915
Subtotal, other changes	0	128,931

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
ADJUSTMENTS TO BASE
(Dollar amounts in thousands)

Total, adjustments to base	0	128,535

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
11.1	Full-time permanent compensation	1,165,848	1,235,558	1,264,181	1,301,769	37,588
11.3	Other than full-time permanent	7,077	7,669	7,824	8,366	542
11.5	Other personnel compensation	64,908	67,508	67,508	68,298	790
11.7	Military Personnel	36,252	39,323	40,259	41,598	1,339
11.9	**Total personnel compensation**	1,274,085	1,350,058	1,379,772	1,420,031	40,259
12.1	Civilian personnel benefits	438,310	463,172	516,132	528,127	11,995
12	Military personnel benefits	2,713	2,505	2,560	3,329	769
13	Benefits for former personnel	27,502	28,485	29,505	29,505	0
21	Travel and transportation of persons	21,491	23,946	23,931	27,841	3,910
22	Transportation of things	13,398	13,643	13,902	14,371	469
23.1	Rental payments to GSA	93,006	94,778	100,209	101,843	1,634
23.2	Rental payments to others	29,381	29,968	30,536	31,416	880
23.3	Communications, utilities, and misc. charges	78,950	80,439	81,971	97,321	15,350
24	Printing and reproduction	4,154	4,162	4,241	5,146	905
25.1	Advisory and assistance services	308,321	270,156	268,861	302,008	33,147
25.2	Other services from non-Federal sources	647,834	600,301	621,528	844,018	222,490
25.3	Other goods and services from Federal sources	139,983	136,808	142,960	192,832	49,872
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	11,001	10,199	10,382	21,025	10,643
25.7	Operation and maintenance of equipment	0	0	0	0	0
26	Supplies and materials	103,405	101,711	105,265	122,850	17,585

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
31	Equipment	49,997	46,539	47,424	74,557	27,133
32	Lands and structures	161	164	164	164	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	916,503	860,072	861,388	1,178,165	316,777
42	Insurance claims and indemnities	5	5	5	5	0
43	Interest and dividends	102	104	104	104	0
44	Refunds	0	0	0	0	0
99.9	Total obligations	**4,160,303**	**4,117,216**	**4,240,841**	**4,994,659**	**753,818**
	Less Mandatory Obligations	(33,410)	(46,517)	(41,607)	(41,607)	0
	Total Discretionary Obligations	**4,126,893**	**4,070,699**	**4,199,234**	**4,953,052**	**753,818**
	Personnel Data					
	Full-time Equivalent Employment					
	Full-time permanent	10,811	11,308	11,308	11,656	348
	Other than full-time permanent	0	0	0	0	0
	Total	10,811	11,308	11,308	11,656	348
	Authorized Positions:					
	Full-time permanent	11,072	12,016	12,016	12,477	461
	Other than full-time permanent	0	0	0	0	0
	Total	11,072	12,016	12,016	12,477	461

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
National Ocean Service
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
11.1	Full-time permanent compensation	135,349	149,064	152,380	164,412	12,032
11.3	Other than full-time permanent	907	1,001	1,021	1,021	0
11.5	Other personnel compensation	2,510	2,763	2,763	2,763	0
11.7	Military Personnel	2,353	2,820	(0)	(0)	0
11.9	**Total personnel compensation**	141,119	155,648	156,164	168,196	12,032
12.1	Civilian personnel benefits	47,751	52,588	58,354	62,926	4,572
12	Military personnel benefits	0	0	0	0	0
13	Benefits for former personnel	28	28	28	28	0
21	Travel and transportation of persons	2,946	2,958	2,956	4,044	1,088
22	Transportation of things	701	713	726	946	220
23.1	Rental payments to GSA	11,771	11,998	12,651	13,601	950
23.2	Rental payments to others	1,809	1,844	1,879	1,879	0
23.3	Communications, utilities, and misc. charges	4,210	4,292	4,374	6,204	1,830
24	Printing and reproduction	179	183	186	986	800
25.1	Advisory and assistance services	76,114	44,844	45,718	45,718	0
25.2	Other services from non-Federal sources	85,264	73,754	76,120	134,790	58,670
25.3	Other goods and services from Federal sources	3,060	2,793	2,847	2,847	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	1,009	1,029	1,049	1,049	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
26	Supplies and materials	5,410	4,948	5,033	6,343	1,310

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
National Ocean Service
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
31	Equipment	8,691	7,297	7,436	17,054	9,618
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	306,070	248,842	248,842	387,281	138,439
42	Insurance claims and indemnities	1	1	1	1	0
43	Interest and dividends	14	14	14	14	0
44	Refunds	0	0	0	0	0
99.9	Total obligations	**696,147**	**613,775**	**624,379**	**853,908**	**229,529**
	Personnel Data					
	Full-time Equivalent Employment					
	Full-time permanent	1,112	1,212	1,188	1,275	87
	Other than full-time permanent	0	0	0	0	0
	Total	1,112	1,212	1,188	1,275	87
	Authorized Positions:					
	Full-time permanent	1,149	1,290	1,266	1,382	116
	Other than full-time permanent	0	0	0	0	0
	Total	1,149	1,290	1,266	1,382	116

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
National Marine Fisheries Service
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
11.1	Full-time permanent compensation	308,592	313,672	321,251	329,406	8,155
11.3	Other than full-time permanent	2,572	2,617	2,673	2,673	0
11.5	Other personnel compensation	8,634	8,757	8,757	8,757	0
11.7	Military Personnel	1,235	1,401	0	0	0
11.9	**Total personnel compensation**	321,033	326,447	332,681	340,836	8,155
12.1	Civilian personnel benefits	116,337	118,227	132,306	134,368	2,062
12	Military personnel benefits	0	0	0	0	0
13	Benefits for former personnel	68	69	69	69	0
21	Travel and transportation of persons	5,705	5,819	5,815	6,642	827
22	Transportation of things	2,147	2,190	2,232	2,232	0
23.1	Rental payments to GSA	15,364	15,671	16,524	16,931	407
23.2	Rental payments to others	2,431	2,480	2,527	2,537	10
23.3	Communications, utilities, and misc. charges	13,083	13,344	13,597	13,617	20
24	Printing and reproduction	2,955	3,014	3,071	3,071	0
25.1	Advisory and assistance services	43,074	38,612	39,379	46,343	6,964
25.2	Other services from non-Federal sources	177,090	157,626	163,569	197,515	33,946
25.3	Other goods and services from Federal sources	11,887	10,659	10,871	12,002	1,131
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	136	139	142	782	640
25.7	Operation and maintenance of equipment	0	0	0	0	0
26	Supplies and materials	15,156	15,459	15,725	17,922	2,197

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
National Marine Fisheries Service
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
31	Equipment	13,955	13,982	14,248	15,527	1,279
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	231,596	231,228	232,544	288,915	56,371
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	18	18	18	18	0
44	Refunds	0	0	0	0	0
99.9	Total obligations	**972,036**	**954,985**	**985,318**	**1,099,327**	**114,009**

Personnel Data					
Full-time Equivalent Employment					
Full-time permanent	2,656	2,675	2,662	2,764	102
Other than full-time permanent	0	0	0	0	0
Total	2,656	2,675	2,662	2,764	102
Authorized Positions:					
Full-time permanent	2,861	3,130	3,117	3,251	134
Other than full-time permanent	0	0	0	0	0
Total	2,861	3,130	3,117	3,251	134

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
Office of Oceanic and Atmospheric Research
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
11.1	Full-time permanent compensation	84,574	103,777	105,855	110,208	4,353
11.3	Other than full-time permanent	1,420	1,743	1,774	1,774	0
11.5	Other personnel compensation	2,335	2,866	2,866	2,948	82
11.7	Military Personnel	741	792	(0)	(0)	0
11.9	**Total personnel compensation**	89,070	109,177	110,494	114,929	4,435
12.1	Civilian personnel benefits	28,886	35,445	38,944	40,277	1,333
12	Military personnel benefits	0	0	0	0	0
13	Benefits for former personnel	59	60	60	60	0
21	Travel and transportation of persons	2,666	2,684	2,682	2,932	250
22	Transportation of things	1,311	1,337	1,362	1,362	0
23.1	Rental payments to GSA	8,814	8,990	9,479	9,518	39
23.2	Rental payments to others	4,977	5,077	5,173	5,807	634
23.3	Communications, utilities, and misc. charges	5,089	5,188	5,287	7,289	2,002
24	Printing and reproduction	337	344	351	441	90
25.1	Advisory and assistance services	21,501	19,006	19,367	19,381	14
25.2	Other services from non-Federal sources	55,598	51,710	53,332	70,979	17,647
25.3	Other goods and services from Federal sources	7,348	6,854	6,984	47,033	40,049
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	4,922	5,020	5,115	11,267	6,152
25.7	Operation and maintenance of equipment	0	0	0	0	0
26	Supplies and materials	11,619	11,295	11,489	14,764	3,275

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
Office of Oceanic and Atmospheric Research
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
31	Equipment	8,151	7,718	7,865	14,536	6,671
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	294,136	297,370	297,370	401,578	104,208
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	15	16	16	16	0
44	Refunds	0	0	0	0	0
99.9	Total obligations	**544,500**	**567,291**	**575,370**	**762,169**	**186,799**
	Personnel Data					
	Full-time Equivalent Employment					
	Full-time permanent	681	826	819	866	47
	Other than full-time permanent	0	0	0	0	0
	Total	681	826	819	866	47
	Authorized Positions:					
	Full-time permanent	736	854	847	910	63
	Other than full-time permanent	0	0	0	0	0
	Total	736	854	847	910	63

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
National Weather Service
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
11.1	Full-time permanent compensation	446,883	461,591	472,572	474,763	2,191
11.3	Other than full-time permanent	1,175	1,213	1,239	1,781	542
11.5	Other personnel compensation	33,199	34,297	34,297	34,297	0
11.7	Military Personnel	508	689	(0)	(0)	0
11.9	**Total personnel compensation**	481,764	497,790	508,108	510,841	2,733
12.1	Civilian personnel benefits	175,452	181,232	202,482	203,107	625
12	Military personnel benefits	0	0	0	0	0
13	Benefits for former personnel	364	371	371	371	0
21	Travel and transportation of persons	4,216	4,798	4,795	5,315	520
22	Transportation of things	7,131	7,253	7,391	7,391	0
23.1	Rental payments to GSA	30,921	31,536	33,253	33,253	0
23.2	Rental payments to others	12,492	12,742	12,984	12,984	0
23.3	Communications, utilities, and misc. charges	47,170	48,108	49,022	57,172	8,150
24	Printing and reproduction	154	157	160	160	0
25.1	Advisory and assistance services	82,582	70,192	71,544	79,681	8,137
25.2	Other services from non-Federal sources	143,303	129,647	135,891	176,680	40,789
25.3	Other goods and services from Federal sources	8,510	7,865	8,016	9,016	1,000
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	188	192	196	4,027	3,831
25.7	Operation and maintenance of equipment	0	0	0	0	0
26	Supplies and materials	51,172	49,681	50,536	54,456	3,920

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
National Weather Service
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
31	Equipment	12,411	11,542	11,761	17,237	5,476
32	Lands and structures	57	59	59	59	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	41,856	39,440	39,440	44,812	5,372
42	Insurance claims and indemnities	4	4	4	4	0
43	Interest and dividends	19	20	20	20	0
44	Refunds	0	0	0	0	0
99.9	Total obligations	**1,099,764**	**1,092,628**	**1,136,032**	**1,216,585**	**80,553**
	Personnel Data					
	Full-time Equivalent Employment					
	Full-time permanent	4,233	4,330	4,325	4,343	18
	Other than full-time permanent	0	0	0	0	0
	Total	4,233	4,330	4,325	4,343	18
	Authorized Positions:					
	Full-time permanent	4,291	4,377	4,372	4,395	23
	Other than full-time permanent	0	0	0	0	0
	Total	4,291	4,377	4,372	4,395	23

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
National Environmental Satellite, Data and Information Service
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
11.1	Full-time permanent compensation	63,400	70,461	72,018	72,277	259
11.3	Other than full-time permanent	318	354	361	361	0
11.5	Other personnel compensation	6,243	6,291	6,291	6,291	0
11.7	Military Personnel	522	588	(0)	(0)	0
11.9	**Total personnel compensation**	70,484	77,695	78,670	78,929	259
12.1	Civilian personnel benefits	22,383	24,840	27,545	27,621	76
12	Military personnel benefits	0	0	0	0	0
13	Benefits for former personnel	4	4	4	4	0
21	Travel and transportation of persons	689	753	753	1,039	286
22	Transportation of things	107	109	111	111	0
23.1	Rental payments to GSA	15,947	16,265	17,150	17,150	0
23.2	Rental payments to others	576	588	599	599	0
23.3	Communications, utilities, and misc. charges	3,667	3,740	3,811	5,364	1,553
24	Printing and reproduction	73	74	75	80	5
25.1	Advisory and assistance services	51,490	52,150	52,973	52,973	0
25.2	Other services from non-Federal sources	60,357	70,962	72,657	109,846	37,189
25.3	Other goods and services from Federal sources	18,929	23,219	23,585	30,067	6,482
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	4,659	3,729	3,788	3,788	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
26	Supplies and materials	2,331	2,333	2,373	3,891	1,518

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
National Environmental Satellite, Data and Information Service
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
31	Equipment	3,046	2,696	2,747	5,747	3,000
32	Lands and structures	104	106	106	106	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	12,450	9,677	9,677	14,402	4,725
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	5	5	5	5	0
44	Refunds	0	0	0	0	0
99.9	Total obligations	**267,301**	**288,945**	**296,629**	**351,722**	**55,093**

Personnel Data					
Full-time Equivalent Employment					
Full-time permanent	507	557	553	555	2
Other than full-time permanent	0	0	0	0	0
Total	507	557	553	555	2
Authorized Positions:					
Full-time permanent	537	587	583	586	3
Other than full-time permanent	0	0	0	0	0
Total	537	587	583	586	3

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
Mission Support
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
11.1	Full-time permanent compensation	82,196	90,826	92,836	100,967	8,131
11.3	Other than full-time permanent	450	500	510	510	0
11.5	Other personnel compensation	2,671	2,946	2,946	3,013	67
11.7	Military Personnel	502	662	(0)	(0)	0
11.9	**Total personnel compensation**	85,819	94,933	96,292	104,490	8,198
12.1	Civilian personnel benefits	28,122	31,069	34,458	36,922	2,464
12	Military personnel benefits	0	0	0	0	0
13	Benefits for former personnel	59	60	60	60	0
21	Travel and transportation of persons	984	1,003	1,002	1,557	555
22	Transportation of things	191	195	199	209	10
23.1	Rental payments to GSA	9,441	9,555	10,348	10,586	238
23.2	Rental payments to others	2,269	2,314	2,358	2,383	25
23.3	Communications, utilities, and misc. charges	1,844	1,881	1,920	3,520	1,600
24	Printing and reproduction	380	311	317	327	10
25.1	Advisory and assistance services	21,605	33,160	27,472	32,104	4,632
25.2	Other services from non-Federal sources	41,009	36,231	37,254	68,809	31,555
25.3	Other goods and services from Federal sources	78,957	73,248	78,272	79,262	990
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	1	1	1	21	20
25.7	Operation and maintenance of equipment	0	0	0	0	0
26	Supplies and materials	1,444	1,457	1,482	1,612	130

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
Mission Support
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
31	Equipment	1,788	1,429	1,456	1,615	159
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	25,358	28,378	28,378	36,040	7,662
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	19	19	19	19	0
44	Refunds	0	0	0	0	0
99.9	Total obligations	**299,289**	**315,244**	**321,287**	**379,535**	**58,248**
	Less Mandatory Obligations	(3,662)	(15,747)	(9,817)	(9,817)	0
	Total Discretionary Obligations	**295,627**	**299,497**	**311,470**	**369,718**	**58,248**
	Personnel Data					
	Full-time Equivalent Employment					
	Full-time permanent	679	743	739	801	62
	Other than full-time permanent	0	0	0	0	0
	Total	679	743	739	801	62
	Authorized Positions:					
	Full-time permanent	652	781	777	856	79
	Other than full-time permanent	0	0	0	0	0
	Total	652	781	777	856	79

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
Office of Marine and Aviation Operations
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
11.1	Full-time permanent compensation	44,855	46,167	47,269	49,736	2,467
11.3	Other than full-time permanent	235	242	247	247	0
11.5	Other personnel compensation	9,315	9,589	9,589	10,230	641
11.7	Military Personnel	30,391	32,370	40,259	41,598	1,339
11.9	**Total personnel compensation**	84,796	88,368	97,364	101,811	4,447
12.1	Civilian personnel benefits	19,378	19,772	22,044	22,907	863
12	Military personnel benefits	2,713	2,505	2,560	3,329	769
13	Benefits for former personnel	26,920	27,892	28,912	28,912	0
21	Travel and transportation of persons	4,284	5,932	5,929	6,313	384
22	Transportation of things	1,810	1,846	1,881	2,120	239
23.1	Rental payments to GSA	748	763	804	804	0
23.2	Rental payments to others	4,827	4,924	5,017	5,228	211
23.3	Communications, utilities, and misc. charges	3,887	3,885	3,959	4,154	195
24	Printing and reproduction	77	79	81	81	0
25.1	Advisory and assistance services	11,956	12,192	12,408	25,808	13,400
25.2	Other services from non-Federal sources	85,213	80,370	82,705	85,399	2,694
25.3	Other goods and services from Federal sources	11,293	12,169	12,384	12,604	220
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	87	89	91	91	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
26	Supplies and materials	16,273	16,539	18,628	23,863	5,235

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
Office of Marine and Aviation Operations
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
31	Equipment	1,955	1,876	1,912	2,842	930
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	5,036	5,137	5,137	5,137	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	11	12	12	12	0
44	Refunds	0	0	0	0	0
99.9	Total obligations	**281,265**	**284,348**	**301,826**	**331,413**	**29,587**
	Less Mandatory Obligations	(29,748)	(30,770)	(31,790)	(31,790)	0
	Total Discretionary Obligations	**251,518**	**253,578**	**270,036**	**299,623**	**29,587**
	Personnel Data					
	Full-time Equivalent Employment					
	Full-time permanent	943	965	1,022	1,052	30
	Other than full-time permanent	0	0	0	0	0
	Total	943	965	1,022	1,052	30
	Authorized Positions:					
	Full-time permanent	846	997	1,054	1,097	43
	Other than full-time permanent	0	0	0	0	0
	Total	846	997	1,054	1,097	43

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
Enacted, 2021	295	287	1,563,830	1,576,830
Less: Other adjustments to base	0	0	(39,250)	0
Less: Carryover	0	0	0	0
2022 Base	295	287	1,524,580	1,576,830
Less: 2022 Program Changes	22	16	661,152	661,152
2022 Estimate	317	303	2,185,732	2,237,982

Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

Comparison by activity/subactivity		2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
National Ocean Service	Pos/BA	0	7,428	1	8,500	1	8,500	1	8,500	0	0
	FTE/OBL	3	8,976	1	8,500	1	8,500	1	8,500	0	0
National Marine Fisheries Service	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
Oceanic and Atmospheric Research	Pos/BA	0	41,931	1	43,500	1	43,500	1	53,500	0	10,000
	FTE/OBL	1	42,132	1	43,500	1	43,500	1	53,500	0	10,000
National Weather Service	Pos/BA	21	102,299	26	133,406	26	133,406	26	112,163	0	(21,243)
	FTE/OBL	22	163,422	25	133,406	25	133,406	25	112,163	0	(21,243)
National Environmental Satellite, Data, & Information Service	Pos/BA	246	1,238,669	236	1,224,924	236	1,224,924	258	1,677,319	22	452,395
	FTE/OBL	220	1,242,097	229	1,224,924	229	1,224,924	245	1,677,319	16	452,395
Mission Support	Pos/BA	0	40,924	1	43,000	1	43,000	1	81,000	0	38,000
	FTE/OBL	2	34,208	1	43,000	1	43,000	1	81,000	0	38,000
Office of Marine Aviation & Operations	Pos/BA	17	97,806	30	123,500	30	123,500	30	305,500	0	182,000
	FTE/OBL	33	105,991	30	123,500	30	123,500	30	305,500	0	182,000
Other	Pos/BA	0	0	0	(13,000)	0	(52,250)	0	(52,250)	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
Total	Pos/BA	284	1,529,057	295	1,563,830	295	1,524,580	317	2,185,732	22	661,152
	FTE/OBL	281	1,596,826	287	1,576,830	287	1,576,830	303	2,237,982	16	661,152

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/Decrease from 2022 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	281	1,596,826	287	1,576,830	287	1,576,830	303	2,237,982	16	661,152
Total Obligations	281	1,596,826	287	1,576,830	287	1,576,830	303	2,237,982	16	661,152
Adjustments to Obligations:										
Deobligations	0	(17,131)	0	(13,000)	0	(13,000)	0	(13,000)	0	0
Unobligated balance, Expiring end of	0	430	0	0	0	0	0	0	0	0
Unobligated Balance, EOY	0	214,786	0	0	0	0	0	0	0	0
Unobligated Balance Adj. SOY (start of	0	(268,381)	0	0	0	0	0	0	0	0
Unobligated Balance, Transferred	0	2,527	0	0	0	0	0	0	0	0
Collections	0	0	0	0	0	0	0	0	0	0
Rescission	0	0	0	0	0	(39,250)	0	(39,250)	0	0
Total Budget Authority	281	1,529,057	287	1,563,830	287	1,524,580	303	2,185,732	16	661,152
Financing from Transfers and Other:										
Unoblig Balance Rescission Adj Appn	0	0	0	0	0	39,250	0	39,250	0	0
Transfer from ORF to PAC	0	(1,000)	0	(33,272)	0	0	0	0	0	0
Transfer from PAC to ORF	0	1,531	0	0	0	0	0	0	0	0
Transfer to OIG	0	1,302	0	2,000	0	2,000	0	2,000	0	0
Net Appropriation	281	1,530,890	287	1,532,558	287	1,565,830	303	2,226,982	16	661,152

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Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
SUMMARY OF FINANCING
(Dollar amounts in thousands)

	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
Direct Discretionary Obligation	1,596,826	1,576,830	1,576,830	2,237,982	661,152
Direct Mandatory Obligation	18,962	32,747	15,637	15,637	0
Total Obligations	**1,615,788**	**1,609,577**	**1,592,467**	**2,253,619**	**661,152**
Adjustments and Obligations:					
Deobligations	(18,473)	(13,000)	(13,000)	(13,000)	0
Unobligated balance, Expiring end of year	566	0	0	0	0
Unobligated Balance, EOY	214,650	0	0	0	0
Unobligated Balance Adj. SOY Disc	(268,381)	0	0	0	0
Unobligated Balance, SOY Mandatory	(76,238)	(58,618)	(25,871)	(25,871)	0
Unobligated Balance, EOY Mandatory	58,618	25,871	10,234	10,234	0
Unobligated Balance, Transferred	2,527	0	0	0	0
Rescission	0	0	(39,250)	(39,250)	0
Total Budget Authority	**1,529,057**	**1,563,830**	**1,524,580**	**2,185,732**	**661,152**
Financing from Transfers and Other:					
Transfer from PAC to ORF	1,531	0	0	0	0
Transfer from ORF to PAC	(1,000)	(33,272)	0	0	0
Transfer to OIG	1,302	2,000	2,000	2,000	0
Unobligated Balance, Rescission	0	0	39,250	39,250	0
Net Appropriation	**1,530,890**	**1,532,558**	**1,565,830**	**2,226,982**	**661,152**

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Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
ADJUSTMENTS TO BASE
(Dollar amounts in thousands)

	FTE	Amount
Adjustment		13,000
Rescission		(39,250)
Financing		(13,000)
Total, adjustments to base	0	(39,250)

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Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
11.1	Full-time permanent compensation	40,349	40,962	40,962	43,171	2,209
11.3	Other than full-time permanent	109	111	111	111	0
11.5	Other personnel compensation	1,021	1,030	1,030	1,030	0
11.7	Military personnel compensation	678	0	0	0	0
11.9	**Total personnel compensation**	42,157	42,104	42,104	44,313	2,209
12.1	Civilian personnel benefits	17,457	17,780	17,780	18,496	716
12	Military personnel benefits	38	0	0	0	0
13	Benefits for former personnel	2	2	2	2	0
21	Travel and transportation of persons	1,237	1,140	1,140	1,415	275
22	Transportation of things	54	53	53	78	25
23.1	Rental payments to GSA	5,163	5,250	5,250	5,250	0
23.2	Rental payments to others	99	100	100	200	100
23.3	Communications, utilities, and misc. charges	3,176	3,235	3,235	4,205	970
24	Printing and reproduction	26	27	27	27	0
25.1	Advisory and assistance services	178,500	223,849	223,849	254,784	30,935
25.2	Other services from non-Federal sources	237,219	236,811	220,201	459,998	239,797
25.3	Other goods and services from Federal sources	911,809	892,866	892,866	1,220,138	327,272
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	20,149	19,697	19,697	19,697	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
26	Supplies and materials	19,812	19,775	19,775	35,734	15,959

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
31	Equipment	122,948	89,598	89,598	132,198	42,600
32	Lands and structures	3,420	3,488	3,488	3,782	294
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	52,495	53,276	53,276	53,276	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	29	27	27	27	0
44	Refunds	0	0	0	0	0
99.9	Total obligations	**1,615,788**	**1,609,077**	**1,592,467**	**2,253,619**	**661,152**
	Less Mandatory Obligations	(18,962)	(32,247)	(15,637)	(15,637)	0
	Total Discretionary Obligations	**1,596,826**	**1,576,830**	**1,576,830**	**2,237,982**	**661,152**
	Personnel Data					
	Full-time Equivalent Employment					
	Full-time permanent	281	287	287	303	16
	Other than full-time permanent	0	0	0	0	0
	Total	281	287	287	303	16
	Authorized Positions:					
	Full-time permanent	284	295	295	317	22
	Other than full-time permanent	0	0	0	0	0
	Total	284	295	295	317	22

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
National Ocean Service
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
11.1	Full-time permanent compensation	234	78	78	78	0
11.3	Other than full-time permanent	1	0	0	0	0
11.5	Other personnel compensation	6	2	2	2	0
11.7	Military personnel compensation	0	0	0	0	0
11.9	**Total personnel compensation**	242	81	81	81	0
12.1	Civilian personnel benefits	81	27	27	27	0
12	Military personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	3	3	3	3	0
22	Transportation of things	5	5	5	5	0
23.1	Rental payments to GSA	30	31	31	31	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and misc. charges	3	3	3	3	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	143	145	145	145	0
25.2	Other services from non-Federal sources	1,932	1,814	1,814	1,814	0
25.3	Other goods and services from Federal sources	8	8	8	8	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
26	Supplies and materials	105	100	100	100	0

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
National Ocean Service
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
31	Equipment	1,995	1,965	1,965	1,965	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	4,429	4,317	4,317	4,317	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99.9	Total obligations	**8,976**	**8,500**	**8,500**	**8,500**	**0**
	Personnel Data					
	Full-time Equivalent Employment					
	Full-time permanent	3	1	1	1	0
	Other than full-time permanent	0	0	0	0	0
	Total	3	1	1	1	0
	Authorized Positions:					
	Full-time permanent	0	1	1	1	0
	Other than full-time permanent	0	0	0	0	0
	Total	0	1	1	1	0

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
Office of Oceanic and Atmospheric Research
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
11.1	Full-time permanent compensation	151	116	116	116	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	4	3	3	3	0
11.7	Military personnel compensation	0	0	0	0	0
11.9	**Total personnel compensation**	155	119	119	119	0
12.1	Civilian personnel benefits	52	40	40	40	0
12	Military personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	1	1	1	1	0
22	Transportation of things	0	0	0	0	0
23.1	Rental payments to GSA	4	3	3	3	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and misc. charges	651	663	663	663	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	313	292	292	292	0
25.2	Other services from non-Federal sources	8,990	9,251	9,251	9,251	0
25.3	Other goods and services from Federal sources	21,295	22,247	22,247	22,247	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
26	Supplies and materials	2,348	2,395	2,395	2,395	0

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
Office of Oceanic and Atmospheric Research
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
31	Equipment	4,211	4,294	4,294	14,294	10,000
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	4,113	4,195	4,195	4,195	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99.9	Total obligations	**42,132**	**43,500**	**43,500**	**53,500**	**10,000**

Personnel Data					
Full-time Equivalent Employment					
Full-time permanent	1	1	1	1	0
Other than full-time permanent	0	0	0	0	0
Total	1	1	1	1	0
Authorized Positions:					
Full-time permanent	0	1	1	1	0
Other than full-time permanent	0	0	0	0	0
Total	0	1	1	1	0

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
National Weather Service
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
11.1	Full-time permanent compensation	4,862	4,547	4,547	4,547	0
11.3	Other than full-time permanent	12	12	12	12	0
11.5	Other personnel compensation	129	121	121	121	0
11.7	Military personnel compensation	5	0	0	0	0
11.9	**Total personnel compensation**	5,009	4,679	4,679	4,679	0
12.1	Civilian personnel benefits	3,036	2,953	2,953	2,953	0
12	Military personnel benefits	0	0	0	0	0
13	Benefits for former personnel	1	1	1	1	0
21	Travel and transportation of persons	405	403	403	403	0
22	Transportation of things	32	33	33	33	0
23.1	Rental payments to GSA	1,007	1,016	1,016	1,016	0
23.2	Rental payments to others	87	88	88	88	0
23.3	Communications, utilities, and misc. charges	2,039	2,076	2,076	2,546	470
24	Printing and reproduction	4	4	4	4	0
25.1	Advisory and assistance services	14,495	14,476	14,476	16,476	2,000
25.2	Other services from non-Federal sources	115,866	85,813	85,813	56,041	(29,772)
25.3	Other goods and services from Federal sources	1,506	1,535	1,535	1,535	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	61	62	62	62	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
26	Supplies and materials	14,312	14,597	14,597	16,656	2,059

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
National Weather Service
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
31	Equipment	1,913	1,947	1,947	5,947	4,000
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	3,644	3,716	3,716	3,716	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	5	5	5	5	0
44	Refunds	0	0	0	0	0
99.9	Total obligations	**163,422**	**133,406**	**133,406**	**112,163**	**(21,243)**
	Personnel Data					
	Full-time Equivalent Employment					
	Full-time permanent	22	25	25	25	0
	Other than full-time permanent	0	0	0	0	0
	Total	22	25	25	25	0
	Authorized Positions:					
	Full-time permanent	21	26	26	26	0
	Other than full-time permanent	0	0	0	0	0
	Total	21	26	26	26	0

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
National Environmental Satellite, Data and Information Service
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
11.1	Full-time permanent compensation	31,409	33,021	33,021	35,230	2,209
11.3	Other than full-time permanent	86	90	90	90	0
11.5	Other personnel compensation	741	779	779	779	0
11.7	Military personnel compensation	0	0	0	0	0
11.9	**Total personnel compensation**	32,236	33,890	33,890	36,099	2,209
12.1	Civilian personnel benefits	12,809	13,467	13,467	14,183	716
12	Military personnel benefits	0	0	0	0	0
13	Benefits for former personnel	1	1	1	1	0
21	Travel and transportation of persons	606	618	618	718	100
22	Transportation of things	6	6	6	6	0
23.1	Rental payments to GSA	3,070	3,131	3,131	3,131	0
23.2	Rental payments to others	10	10	10	10	0
23.3	Communications, utilities, and misc. charges	441	449	449	949	500
24	Printing and reproduction	9	9	9	9	0
25.1	Advisory and assistance services	146,886	144,069	144,069	173,004	28,935
25.2	Other services from non-Federal sources	60,702	61,338	61,338	128,251	66,913
25.3	Other goods and services from Federal sources	880,797	862,104	862,104	1,189,376	327,272
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	20,019	19,635	19,635	19,635	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
26	Supplies and materials	830	846	846	1,096	250

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
National Environmental Satellite, Data and Information Service
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
31	Equipment	42,020	42,860	42,860	68,360	25,500
32	Lands and structures	1,399	1,427	1,427	1,427	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	40,242	41,047	41,047	41,047	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	16	17	17	17	0
44	Refunds	0	0	0	0	0
99.9	Total obligations	**1,242,097**	**1,224,924**	**1,224,924**	**1,677,319**	**452,395**
	Personnel Data					
	Full-time Equivalent Employment					
	Full-time permanent	220	229	229	245	16
	Other than full-time permanent	0	0	0	0	0
	Total	220	229	229	245	16
	Authorized Positions:					
	Full-time permanent	246	236	236	258	22
	Other than full-time permanent	0	0	0	0	0
	Total	246	236	236	258	22

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
Mission Support
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
11.1	Full-time permanent compensation	299	84	84	84	0
11.3	Other than full-time permanent	1	0	0	0	0
11.5	Other personnel compensation	6	2	2	2	0
11.7	Military personnel compensation	0	0	0	0	0
11.9	**Total personnel compensation**	306	87	87	87	0
12.1	Civilian personnel benefits	103	29	29	29	0
12	Military personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	119	10	10	110	100
22	Transportation of things	3	1	1	1	0
23.1	Rental payments to GSA	6	2	2	2	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Communications, utilities, and misc. charges	2	1	1	1	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	8,312	480	480	480	0
25.2	Other services from non-Federal sources	32,198	65,184	48,574	86,180	37,606
25.3	Other goods and services from Federal sources	8,082	6,847	6,847	6,847	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	69	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
26	Supplies and materials	920	514	514	514	0

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
Mission Support
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
31	Equipment	960	31	31	31	0
32	Lands and structures	2,020	2,061	2,061	2,355	294
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	68	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	3	1	1	1	0
44	Refunds	0	0	0	0	0
99.9	Total obligations	**53,170**	**75,247**	**58,637**	**96,637**	**38,000**
	Less Mandatory Obligations	(18,962)	(32,247)	(15,637)	(15,637)	0
	Total Discretionary Obligations	**34,208**	**43,000**	**43,000**	**81,000**	**38,000**
	Personnel Data					
	Full-time Equivalent Employment					
	Full-time permanent	2	1	1	1	0
	Other than full-time permanent	0	0	0	0	0
	Total	2	1	1	1	0
	Authorized Positions:					
	Full-time permanent	0	1	1	1	0
	Other than full-time permanent	0	0	0	0	0
	Total	0	1	1	1	0

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
Office of Marine and Aviation Operations
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
11.1	Full-time permanent compensation	3,394	3,116	3,116	3,116	0
11.3	Other than full-time permanent	9	8	8	8	0
11.5	Other personnel compensation	134	123	123	123	0
11.7	Military personnel compensation	672	0	0	0	0
11.9	**Total personnel compensation**	4,210	3,248	3,248	3,248	0
12.1	Civilian personnel benefits	1,376	1,263	1,263	1,263	0
12	Military personnel benefits	38	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	103	105	105	180	75
22	Transportation of things	8	8	8	33	25
23.1	Rental payments to GSA	1,046	1,067	1,067	1,067	0
23.2	Rental payments to others	2	2	2	102	100
23.3	Communications, utilities, and misc. charges	42	43	43	43	0
24	Printing and reproduction	13	13	13	13	0
25.1	Advisory and assistance services	8,350	64,387	64,387	64,387	0
25.2	Other services from non-Federal sources	17,530	13,411	13,411	178,461	165,050
25.3	Other goods and services from Federal sources	123	125	125	125	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
26	Supplies and materials	1,298	1,323	1,323	14,973	13,650

Exhibit 16A

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
Office of Marine and Aviation Operations
SELECT ACTIVITIES BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
31	Equipment	71,849	38,500	38,500	41,600	3,100
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	4	5	5	5	0
44	Refunds	0	0	0	0	0
99.9	Total obligations	**105,991**	**123,500**	**123,500**	**305,500**	**182,000**
	Personnel Data					
	Full-time Equivalent Employment					
	Full-time permanent	33	30	30	30	0
	Other than full-time permanent	0	0	0	0	0
	Total	33	30	30	30	0
	Authorized Positions:					
	Full-time permanent	17	30	30	30	0
	Other than full-time permanent	0	0	0	0	0
	Total	17	30	30	30	0

Exhibit 18

Department of Commerce
National Oceanic and Atmospheric Administration
ACTIVITY/SUBACTIVITY CHANGE CROSSWALK
Part 1 – 2022 Structure
(Dollar amounts in thousands)

Activity / Subactivity	2022 Direct Obligations*	Proposed Changes
National Environmental Satellite, Data, and Information Service		
Systems Acquisition		
Geostationary Systems - R (GOES-R)	334,500	Move to Geostationary Earth Orbit (GEO)
Polar Weather Satellites (PWS)	657,835	Move to Low Earth Orbit (LEO)
Cooperative Data and Rescue Services (CDARS)	14,400	Move to Low Earth Orbit (LEO)
COSMIC 2/GNSS RO	5,892	Move to Low Earth Orbit (LEO)
Space Weather Follow On (SWFO)	108,115	Move to Space Weather Observations (SWO)
Projects, Planning and Analysis (PPA)	6,606	Move to Space Weather Observations (SWO)
Projects, Planning and Analysis (PPA)	9,339	Move to Common Ground Services (CGS)

* The 2022 Proposed Budget Restructure is done at the FY 2021 Enacted funding level and does not include any technical transfers or program changes outlined in the 2022 President's Budget.

Department of Commerce
National Oceanic and Atmospheric Administration
ACTIVITY/SUBACTIVITY CHANGE CROSSWALK
Part 2 – 2022 Structure
(Dollar amounts in thousands)

Activity / Subactivity	FY 2018 Spend Plan	FY 2019 Spend Plan	FY 2020 Spend Plan	FY 2021 Enacted	FY 2022 President's Budget
National Environmental Satellite, Data, and Information Service					
Systems Acquisition					
Geostationary Systems - R (GOES-R)	518,532	408,380	304,056	334,500	-
Geostationary and Extended Orbits (GEO-XO)	-	-	-	10,000	-
Polar Weather Satellites (PWS)	-	-	745,000	657,835	-
Joint Polar Satellite Systems (JPSS)	775,777	548,035	-	-	-
Polar Follow-On (PFO)	419,000	329,956	-	-	-
Cooperative Data and Rescue Services (CDARS)	21,650	26,539	11,350	14,400	-
COSMIC 2/GNSS RO	6,100	5,892	5,892	5,892	-
Space Weather Follow On (SWFO)	8,545	27,000	64,000	108,115	-
Projects, Planning and Analysis (PPA)	39,391	40,000	31,000	15,945	-
Common Ground Services (CGS)[1]	57,325	58,000	55,707	39,287	73,633
Systems/Services Architecture & Engineering (SAE)	-	-	33,990	38,500	81,500
System Architecture and Advance Planning	4,929	4,929	-	-	-
Commercial Weather Data Pilot	6,000	6,000	-	-	-
	1,857,249	1,454,731	1,250,995	1,224,474	
Systems Acquisition					
Geostationary Earth Orbit (GEO)					800,500
Low Earth Orbit (LEO)					512,730
Space Weather Observations (SWO)					208,506
					1,676,869

[1] The FY 2022 President's Budget requests to rename the Satellite Ground Services PPA to Common Ground Services.

Exhibit 3

Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Service
Budget Estimates, Fiscal Year 2022

Executive Summary

For FY 2022, NOAA requests a total of $884,628,000 and 1,308 FTE/ 1,415 positions for the National Ocean Service (NOS), including an increase of $229,529 and 87 FTE/ 116 positions in program changes.

NOS enables the safe, sustainable, and efficient use of marine and coastal resources across the range of significant U.S. economic sectors. Those sectors include maritime commerce and marine transportation, fishing and aquaculture, energy development, coastal recreation, and inland export and import industries, which depend on the flow of goods through seaports. NOS's products and services sustain livelihoods, reduce risk, and facilitate adaptation to change. Its earth observations and navigation products are used daily by ship pilots, port managers, surveyors, resource managers, and airports. When oil spills, chemical releases, and marine debris damage coastal resources, NOS's scientific expertise is essential to emergency response and long-term recovery.

While coastal and Great Lakes counties represent less than 10 percent of the land area of the U.S., they are home to over 40 percent of our country's population[1]. Supporting them and other communities across the nation, the U.S. oceans and Great Lakes economy consists of 157,000 business establishments, employing 3.3 million people, paying $132 billion in wages, and producing $307 billion in gross domestic product[2]. And while these communities and their economies depend on marine resources, they also face unique environmental threats:

- Coastal storms threaten lives and destroy property
- Tidal flooding damages infrastructure and forces costly adaptations
- Ecological hazards, such as harmful algal blooms, disrupt fishing, water supplies, and tourism
- Production and transport of fossil fuels, while essential to the U.S. economy, creates a constant risk of spills, including catastrophic ones like the Deepwater Horizon oil spill
- The same coastal industries that are the engines of thriving ocean economies also generate port congestion, marine pollution, and navigation hazards.

As a result, coastal communities, governments, and businesses need reliable data and tools to help make informed decisions in the face of these threats. NOS helps people and places prepare for, respond to, and recover from these coastal disasters. NOS provides communities with data, observations, modeling, tools, and training to understand, forecast and respond to the local impacts of

[1] https://oceanservice.noaa.gov/facts/population.html
[2] National Oceanic and Atmospheric Administration (NOAA), Office for Coastal Management. 2020."NOAA Report on the U.S. Marine Economy." Charleston, SC: NOAA Office for Coastal Management. Available at: https://coast.noaa.gov/data/digitalcoast/pdf/econ-report.pdf

climate change, sea level change and coastal flooding, harmful algal blooms, extreme natural events, and changing ecosystem conditions. NOS promotes smart resource management through technical assistance, applied research, and partnership building. NOS also plays a leading role in protecting the Nation's special marine places, including the National Marine Sanctuaries System, the National Estuarine Research Reserve System, and the National System of Marine Protected Areas.

Significant Adjustments:

Inflationary Adjustments
NOAA's FY 2022 Base includes an increase of $13,530,000 0 FTE/ 0 positions to account for the full funding requirement for certain inflationary adjustments to current programs for NOS activities. This includes the estimated 2022 civilian pay raise of 2.7 percent and military pay raise of 2.7 percent, as well as inflationary increases for labor and non-labor activities including benefits and rent charges from the General Services Administration.

Technical Adjustments
NOAA requests the following transfers for a net change of $0 and 0 FTE/ 0 positions to the agency:

From Office	Subactivity	To Office	Subactivity	Amount
NOS	Navigation, Observations and Positioning (ORF)	OMAO	NOAA Commissioned Officer Corps (ORF)	$2,044,000 / 18 FTE / 18 positions
NOS	Coastal Science, Assessment, Response & Restoration (ORF)	OMAO	NOAA Commissioned Officer Corps (ORF)	$319,000 / 4 FTE / 4 positions
NOS	Sanctuaries and Marine Protected Areas (ORF)	OMAO	NOAA Commissioned Officer Corps (ORF)	$563,000 / 2 FTE / 2 positions

NOAA requests to transfer $2,044,000 and 18 FTE/18 positions from Navigation, Observations and Positioning (ORF) PPA, $319,000 and 4 FTE/4 positions from Coastal Science, Assessment, Response & Restoration (ORF) PPA, and $563,000 and 2 FTE/2 positions from Sanctuaries and Marine Protected Areas (ORF) PPA, for a total of $2,926,000 and 24 FTE / 24 positions to the OMAO NOAA Commissioned Officer Corps PPA, to allow for better alignment of funding and greater transparency over the full cost of the NOAA Corps. With this transfer, funding for all NOAA Corps personnel will reside within OMAO. This increases efficiency within the program by reducing

administrative burdens and allows NOAA to better manage personnel requirements consistent with the NOAA Corps Amendments Act of 2020.

From Office	Subactivity	To Office	Subactivity	Amount
NOS	Coastal Science, Assessment, Response and Restoration (ORF)	NOS	Competitive Research (ORF)	$1,000,000 / 0 FTE / 0 positions

NOAA requests to transfer $1,000,000 and 0 FTE/0 positions from the Coastal Science, Assessment, Response and Restoration (ORF) subactivity to the Competitive Research (ORF) subactivity to support the National Weather Service's new Hydrology and Water Resources Cooperative Institute, The Consolidated Appropriations Act, 2021 (Public Law 116-260) directed NOS to apply up to $1,000,000 to support this initiative. As the Cooperative Institute is external, competitive funding, this work is best suited to be placed in the Competitive Research PPA, as opposed to the Coastal Science, Assessment, Response and Restoration PPA, which supports operational costs and internal research for the National Centers for Coastal Ocean Science.

Exhibit 3T

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
TRANSFER CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Navigation, Observation, and Positioning
Subactivity: Navigation Observation and Positioning (ORF) Transfer to OMAO NOAA Commissioned Officer Corps (ORF)

	Object Class	2021 Enacted	2022 Transfer	2022 Base*
11.1	Full-time permanent compensation	39,770	0	44,569
11.3	Other than full-time permanent	0	0	0
11.5	Other personnel compensation	1,584	0	1,583
11.7	Military personnel compensation	2,044	(2,044)	0
11.9	Total personnel compensation	43,398	(2,044)	46,152
12	Civilian personnel benefits	22,739	0	24,428
13	Benefits for former personnel	0	0	0
21	Travel and transportation of persons	1,613	0	1,612
22	Transportation of things	346	0	346
23	Rent, communications, and utilitites	8,548	0	8,544
23.1	Rental payments to GSA	0	0	0
23.2	Rental Payments to others	0	0	0
23.3	Communications, utilities and misc charges	0	0	0
24	Printing and reproduction	17	0	17
25.1	Advisory and assistance services	0	0	0
25.2	Other services from non-Federal sources	59,901	0	59,966
25.3	Other goods and services from Federal sources	0	0	0
25.4	Operation and maintenance of facilities	0	0	0
25.5	Research and development contracts	0	0	0
25.6	Medical care	0	0	0
25.7	Operation and maintenance of equipment	0	0	0
25.8	Subsistence and support of persons	0	0	0
26	Supplies and materials	2,728	0	2,727
31	Equipment	717	0	716
32	Lands and structures	0	0	0
33	Investments and loans	0	0	0
41	Grants, subsidies and contributions	19,605	0	19,597
42	Insurance claims and indemnities	0	0	0
43	Interest and dividends	0	0	0
44	Refunds	0	0	0
99	Total obligations	159,613	(2,044)	164,105

*The 2022 Base column reflects the full 2022 Base for this Subactivity, including calculated ATBs and any additional transfers.

Exhibit 3T

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
TRANSFER CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Coastal Science and Assessment
Subactivity: Coastal Science, Assessment, Response and Restoration (ORF) Transfer to OMAO NOAA Commissioned Officer Corps (ORF)

	Object Class	2021 Enacted	2022 Transfer	2022 Base*
11.1	Full-time permanent compensation	28,558	0	30,685
11.3	Other than full-time permanent	375	0	375
11.5	Other personnel compensation	775	0	775
11.7	Military personnel compensation	319	(319)	0
11.9	Total personnel compensation	30,027	(319)	31,835
12	Civilian personnel benefits	9,621	0	10,730
13	Benefits for former personnel	95	0	95
21	Travel and transportation of persons	608	0	608
22	Transportation of things	155	0	155
23	Rent, communications, and utilitites	2,955	0	2,954
23.1	Rental payments to GSA	0	0	0
23.2	Rental Payments to others	0	0	0
23.3	Communications, utilities and misc charges	0	0	0
24	Printing and reproduction	106	0	106
25.1	Advisory and assistance services	0	0	0
25.2	Other services from non-Federal sources	33,800	0	33,797
25.3	Other goods and services from Federal sources	0	0	0
25.4	Operation and maintenance of facilities	0	0	0
25.5	Research and development contracts	0	0	0
25.6	Medical care	0	0	0
25.7	Operation and maintenance of equipment	0	0	0
25.8	Subsistence and support of persons	0	0	0
26	Supplies and materials	1,454	0	1,454
31	Equipment	683	0	683
32	Lands and structures	0	0	0
33	Investments and loans	0	0	0
41	Grants, subsidies and contributions	5,736	0	4,750
42	Insurance claims and indemnities	0	0	0
43	Interest and dividends	0	0	0
44	Refunds	0	0	0
99	Total obligations	85,240	(319)	87,167

*The 2022 Base column reflects the full 2022 Base for this Subactivity, including calculated ATBs and any additional transfers.

Exhibit 3T

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
TRANSFER CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Ocean and Coastal Management and Services
Subactivity: Sanctuaries and Marine Protected Areas (ORF) Transfer to OMAO NOAA Commissioned Officer Corps (ORF)

	Object Class	2021 Enacted	2022 Transfer	2022 Base*
11.1	Full-time permanent compensation	21,646	0	23,237
11.3	Other than full-time permanent	0	0	0
11.5	Other personnel compensation	585	0	587
11.7	Military personnel compensation	563	(563)	0
11.9	Total personnel compensation	22,794	(563)	23,824
12	Civilian personnel benefits	8,756	0	9,376
13	Benefits for former personnel	0	0	0
21	Travel and transportation of persons	176	0	176
22	Transportation of things	96	0	96
23	Rent, communications, and utilitites	3,230	0	3,237
23.1	Rental payments to GSA	0	0	0
23.2	Rental Payments to others	0	0	0
23.3	Communications, utilities and misc charges	0	0	0
24	Printing and reproduction	77	0	77
25.1	Advisory and assistance services	0	0	0
25.2	Other services from non-Federal sources	13,681	0	13,712
25.3	Other goods and services from Federal sources	0	0	0
25.4	Operation and maintenance of facilities	0	0	0
25.5	Research and development contracts	0	0	0
25.6	Medical care	0	0	0
25.7	Operation and maintenance of equipment	0	0	0
25.8	Subsistence and support of persons	0	0	0
26	Supplies and materials	1,006	0	1,009
31	Equipment	242	0	242
32	Lands and structures	0	0	0
33	Investments and loans	0	0	0
41	Grants, subsidies and contributions	5,474	0	5,486
42	Insurance claims and indemnities	0	0	0
43	Interest and dividends	0	0	0
44	Refunds	0	0	0
99	Total obligations	55,532	(563)	57,235

*The 2022 Base column reflects the full 2022 Base for this Subactivity, including calculated ATBs and any additional transfers.

Exhibit 3T

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
TRANSFER CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Coastal Science and Assessment
Subactivity: Coastal Science, Assessment, Response and Restoration (ORF) Transfer to Competitive Research (ORF)

	Object Class	2021 Enacted	2022 Transfer	2022 Base*
11.1	Full-time permanent compensation	28,877	0	30,685
11.3	Other than full-time permanent	375	0	375
11.5	Other personnel compensation	775	0	775
11.7	Military personnel compensation	0	0	0
11.9	Total personnel compensation	30,027	0	31,835
12	Civilian personnel benefits	9,621	0	10,730
13	Benefits for former personnel	95	0	95
21	Travel and transportation of persons	608	0	608
22	Transportation of things	155	0	155
23	Rent, communications, and utilitites	2,955	0	2,954
23.1	Rental payments to GSA	0	0	0
23.2	Rental Payments to others	0	0	0
23.3	Communications, utilities and misc charges	0	0	0
24	Printing and reproduction	106	0	106
25.1	Advisory and assistance services	0	0	0
25.2	Other services from non-Federal sources	33,800	0	33,797
25.3	Other goods and services from Federal sources	0	0	0
25.4	Operation and maintenance of facilities	0	0	0
25.5	Research and development contracts	0	0	0
25.6	Medical care	0	0	0
25.7	Operation and maintenance of equipment	0	0	0
25.8	Subsistence and support of persons	0	0	0
26	Supplies and materials	1,454	0	1,454
31	Equipment	683	0	683
32	Lands and structures	0	0	0
33	Investments and loans	0	0	0
41	Grants, subsidies and contributions	5,736	(1,000)	4,750
42	Insurance claims and indemnities	0	0	0
43	Interest and dividends	0	0	0
44	Refunds	0	0	0
99	Total obligations	85,240	(1,000)	87,167

*The 2022 Base column reflects the full 2022 Base for this Subactivity, including calculated ATBs and any additional transfers.

Exhibit 3T

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
TRANSFER CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Coastal Science and Assessment
Subactivity: Competitive Research (ORF) Transfer from Coastal Science, Assessment, Response and Restoration (ORF)

	Object Class	2021 Enacted	2022 Transfer	2022 Base
11.1	Full-time permanent compensation	0	0	0
11.3	Other than full-time permanent	0	0	0
11.5	Other personnel compensation	0	0	0
11.7	Military personnel compensation	0	0	0
11.9	Total personnel compensation	0	0	0
12	Civilian personnel benefits	0	0	0
13	Benefits for former personnel	0	0	0
21	Travel and transportation of persons	70	0	70
22	Transportation of things	4	0	4
23	Rent, communications, and utilitites	10	0	10
23.1	Rental payments to GSA	0	0	0
23.2	Rental Payments to others	0	0	0
23.3	Communications, utilities and misc charges	0	0	0
24	Printing and reproduction	7	0	7
25.1	Advisory and assistance services	0	0	0
25.2	Other services from non-Federal sources	2,705	0	2,705
25.3	Other goods and services from Federal sources	0	0	0
25.4	Operation and maintenance of facilities	0	0	0
25.5	Research and development contracts	0	0	0
25.6	Medical care	0	0	0
25.7	Operation and maintenance of equipment	0	0	0
25.8	Subsistence and support of persons	0	0	0
26	Supplies and materials	343	0	343
31	Equipment	21	0	21
32	Lands and structures	0	0	0
33	Investments and loans	0	0	0
41	Grants, subsidies and contributions	17,840	1,000	18,840
42	Insurance claims and indemnities	0	0	0
43	Interest and dividends	0	0	0
44	Refunds	0	0	0
99	Total obligations	21,000	1,000	22,000

*The 2022 Base column reflects the full 2022 Base for this Subactivity, including calculated ATBs and any additional transfers.

Exhibit 10

Department of Commerce
National Oceanic and Atmospheric Administration
PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS
(Dollar amounts in thousands)

		2020 Actuals		2021 Enacted		2022 Base		2022 Estimate		Increase/Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
NATIONAL OCEAN SERVICE											
Navigation, Observations and Positioning	Pos/BA	604	229,762	660	232,113	642	236,605	699	288,096	57	51,491
	FTE/OBL	568	267,018	627	232,113	609	236,605	651	288,096	42	51,491
Coastal Science and Assessment	Pos/BA	249	108,676	281	106,240	277	109,167	302	154,327	25	45,160
	FTE/OBL	242	113,432	266	106,240	262	109,167	281	154,327	19	45,160
Ocean and Coastal Management and Services	Pos/BA	296	267,148	349	275,422	347	278,607	381	411,485	34	132,878
	FTE/OBL	302	315,697	319	275,422	317	278,607	343	411,485	26	132,878
TOTAL NOS - ORF	**Pos/BA**	**1,149**	**605,586**	**1,290**	**613,775**	**1,266**	**624,379**	**1,382**	**853,908**	**116**	**229,529**
	FTE/OBL	**1,112**	**696,147**	**1,212**	**613,775**	**1,188**	**624,379**	**1,275**	**853,908**	**87**	**229,529**
NOS Construction	Pos/BA	0	7,428	1	8,500	1	8,500	1	8,500	0	0
	FTE/OBL	3	8,976	1	8,500	1	8,500	1	8,500	0	0
TOTAL NOS - PAC	**Pos/BA**	**0**	**7,428**	**1**	**8,500**	**1**	**8,500**	**1**	**8,500**	**0**	**0**
	FTE/OBL	**3**	**8,976**	**1**	**8,500**	**1**	**8,500**	**1**	**8,500**	**0**	**0**
Damage Assessment and Restoration Revolving Fund	**Pos/BA**	**30**	**3,351**	**30**	**5,855**	**30**	**6,000**	**30**	**6,000**	**0**	**0**
	FTE/OBL	**36**	**36,284**	**30**	**300,000**	**30**	**48,462**	**30**	**48,462**	**0**	**0**
Sanctuaries Asset Forfeiture Fund	**Pos/BA**	**0**	**18**	**0**	**114**	**0**	**120**	**0**	**120**	**0**	**0**
	FTE/OBL	**0**	**25**	**0**	**120**	**0**	**120**	**0**	**120**	**0**	**0**
Gulf Coast Ecosystem Restoration Fund	**Pos/BA**	**1**	**0**	**2**	**0**	**1**	**0**	**1**	**0**	**0**	**0**
	FTE/OBL	**2**	**4,968**	**2**	**7,798**	**1**	**6,100**	**1**	**6,100**	**0**	**0**
TOTAL NOS	**Pos/BA**	**1,180**	**616,383**	**1,323**	**628,244**	**1,298**	**638,999**	**1,414**	**868,528**	**116**	**229,529**
	FTE/OBL	**1,153**	**746,400**	**1,245**	**930,193**	**1,220**	**687,561**	**1,307**	**917,090**	**87**	**229,529**

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Navigation, Observations and Positioning

Goal Statement

Produce physical oceanographic and geodetic observations and applications for the safe and efficient marine commerce along America's oceans, coasts, and Great Lakes. This foundational data informs many other NOAA mission areas and essential activities, such as hazard and inundation forecasting, emergency response, habitat restoration, fishing, recreation and coastal energy development.

Base Program

Marine transportation is a cornerstone of the Blue Economy generating $5.4 trillion and employing more than thirty million people in 2018 and expanding every year.[3] Through the activities contained within Navigation, Observations and Positioning, NOS makes safe and efficient maritime commerce possible as the Nation's authority on hydrography, shoreline mapping, and nautical charts; water levels, tides, and currents; and geodetic positioning. This includes mapping and characterization of the U.S. Exclusive Economic Zone (EEZ), Arctic and subarctic shoreline and nearshore Alaska.

The following offices are responsible for carrying out the activities contained within Navigation, Observations and Positioning:

- **Office of Coast Survey** – is responsible for surveying and producing navigation charts in the Nation's waters. It is America's oldest scientific agency and NOAA's oldest mission, dating to the administration of Thomas Jefferson in 1807. Available at: https://nauticalcharts.noaa.gov/
- **National Geodetic Survey (NGS)** – provides the authoritative U.S. positioning framework, delineates the national shoreline and sets standards for all foundational positioning, geodesy, and coastal mapping activities. Available at: https://geodesy.noaa.gov/
- **Center for Operational Oceanographic Products and Services (CO-OPS)** – produces oceanographic observations, predictions, and forecasts of tides, currents, and water levels. CO-OPS also provides the vertical framework for tidal datums across the U.S., and maintains long term sea level trends for the nation. Available at: https://tidesandcurrents.noaa.gov/
- **Integrated Ocean Observing System (IOOS) Office** – NOAA's IOOS Office leads the implementation and administration of a network of Federal and non-Federal observing systems that fulfill regional, national, and global needs for ocean

[3] NOAA Business Brief (2020). https://www.noaa.gov/sites/default/files/atoms/files/NOAA%202020%20Business%20Brief%20April%202020.pdf

observations and information. U.S. IOOS is a partnership of 17 Federal agencies and 11 Regional Associations (RAs). NOAA's IOOS Office is available at: https://ioos.noaa.gov/.

Statement of Operating Objectives

Schedule and Milestones:

- Partner with NOAA/OAR/Ocean Acidification Program to deploy and operate ocean acidification sensors (buoys, shore stations, gliders) on regional IOOS platforms (ongoing)
- Coordinate within NOS to deploy and conduct Harmful Algal Bloom (HAB) observing and forecasting (ongoing)
- Transition demonstrated marine sensor tools and technologies into operations (ongoing)
- Coordinate the development of the interagency mapping strategy to map, explore, and characterize the U.S. EEZ, Arctic and sub-Arctic shoreline, and nearshore of Alaska
- Coordinate with Alaska Mapping Executive Committee on the development of the interagency mapping strategy to map, explore, and characterize the U.S. EEZ, Arctic and sub-Arctic shoreline, and nearshore of Alaska

Deliverables:

- Release updated version of precision marine navigation dissemination system and launch upgraded website.
- Complete build out of western Gulf of Mexico region and maintain the existing northeast Atlantic national bathymetric source database
- 2,429 square nautical miles of hydrographic data collected
- 120 hydrographic surveys (conducted by NOAA survey units, contractors, and other sources) evaluated and approved
- Investigate 150 chart discrepancies within the nation's top 60 ports.
- Enhanced procedures and technology to be implemented to improve hydrographic survey efficiency via ellipsoidally-referenced surveying
- Update U.S. Tide Predictions and Current Predictions on a quarterly basis
- Greater than 95 percent of water level data made available to the public annually
- Produce a highly-accurate gravity-based geoid based on Gravity for the Redefinition of the American Vertical Datum (GRAV-D) data (FY 2024)
- Expand Foundation Continuously Operating Reference Stations (CORS) Network by building new stations, adopting high-quality stations from Federal partner networks, and upgrading stations to the strict International Global Navigation Satellite System (GNSS) Service standard

- Deliver products from newly operational West Coast Operational Forecast System, NOS' first data assimilative ocean model, to planners, emergency responders, and other stakeholders
- Continue glider-based subsurface monitoring in every region of the U.S. EEZ
- Expand the network of surface current observing platforms producing real time observations and informing forecasts along the U.S. coastline
- Utilize a comprehensive data management and cyberinfrastructure system that enables the dissemination of diverse and distributed ocean observing data, products and services
- Seven percent of the National Shoreline and 33 percent of Priority Ports Shoreline to be updated with new aerial imagery and 1,200 square nautical miles of nearshore topographic-bathymetric (topobathy) data from light detection and ranging (lidar)
- Update major ports in Alaska every three years
- Update 500 miles of Alaska Shoreline with current/new aerial imagery and elevation data
- Update 200-300 square miles of Alaska nearshore topobathy data from lidar
- Strengthen U.S. shipping and fishing industries through further exploration and characterization of ocean systems and resources throughout the U.S. EEZ, Arctic and sub-Arctic shoreline, and nearshore Alaska.

Explanation and Justification

		2020 Actuals		2021 Enacted		2022 Base Program	
Comparison by subactivity		Personnel	Amount	Personnel	Amount	Personnel	Amount
Navigation, Observations and Positioning	Pos/BA	581	158,833	636	159,613	618	164,105
	FTE/OBL	547	193,317	603	159,613	585	164,105
Hydrographic Survey Priorities/Contracts	Pos/BA	23	31,968	24	32,000	24	32,000
	FTE/OBL	21	32,003	24	32,000	24	32,000
IOOS Regional Observations	Pos/BA	0	38,961	0	40,500	0	40,500
	FTE/OBL	0	41,698	0	40,500	0	40,500
Total Activity	Pos/BA	604	229,762	660	232,113	642	236,605
	FTE/OBL	568	267,018	627	232,113	609	236,605

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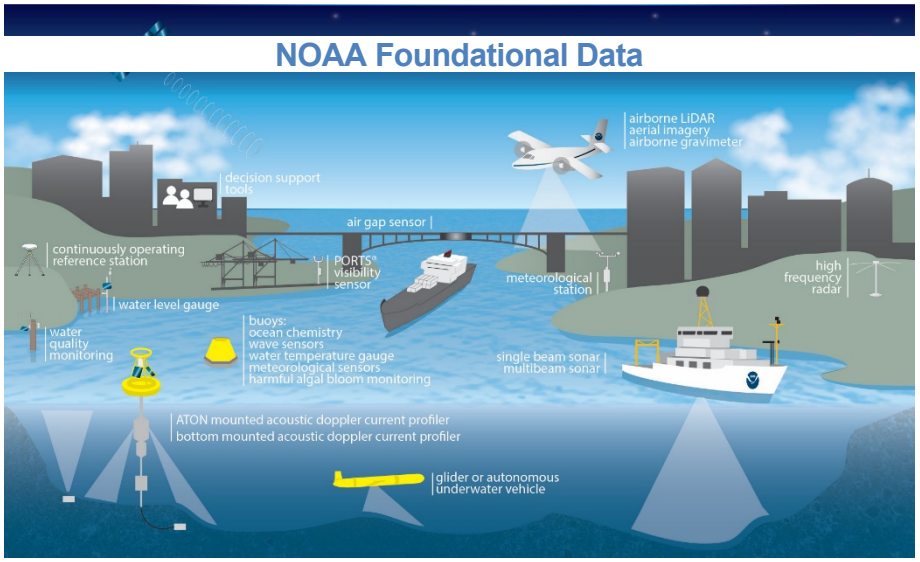
Navigation Services

Just as highways and railways are the backbone of U.S. surface transportation, NOAA's navigation products and services are the information-based infrastructure for safe and efficient marine transportation. In 2020, U.S. seaports moved nearly $1.65 trillion of goods in international cargo[4], supporting agriculture, manufacturing, retail trade and other activities. Commercial shippers, fishers, the U.S. Navy, the U.S. Coast Guard, state and local governments, recreational boaters, and many others rely on NOAA's charts and foundational oceanographic services. NOAA uses all resources available to meet demands from the growing marine transportation industry, including initiatives such as the Integrated Ocean and Coastal Mapping program. Through this program, NOAA leads the National coordination on acquisition and management of ocean and coastal mapping data to maximize return on mapping investment. NOAA's foundational data strengthens the ability of our coastal communities to adapt to changing conditions and recover from adverse events, which depends on a basic understanding of our environment.



[4] Compiled by U.S. Department of Transportation (USDOT), Research and Innovative Technology Administration (RITA), Bureau of Transportation Statistics {BTS). Total, water and air data-U.S. Department of Commerce, U.S. Census Bureau, Foreign Trade Division, U.S. Exports of Merchandise, CD-ROM and U.S. Imports of Merchandise -- as reported in 2020 Transportation Statistics Primer; K. Eric Wolfe, Chief Economist, Office of the Assistant Administrator, National Ocean Service, NOAA, Silver Spring, MD - March 31, 2021

NOAA's suite of navigation products and services comprises the following:

- **Marine Charts and Hydrographic Surveys:** NOAA cartographers develop and maintain approximately 2,000 navigation products, including over 1,700 electronic navigation charts, to ensure safe navigation in the 511,000 square nautical miles of navigationally significant U.S. waters. NOAA surveys these waters for depths and hazards to navigation. This hydrographic data is also useful for many other applications such as modeling, fisheries management, marine debris mitigation, and coastal planning. Surveys using NOAA platforms and NOAA personnel are essential to maintaining the technical expertise necessary to oversee contracts, quality control data, develop survey technologies, and coordinate with the International Hydrographic Organization. At the same time, NOAA also depends on private sector surveyors to provide critical capacity for meeting survey needs. In 2020, NOAA released a prototype of the Custom Chart Tool, which allows users to create their own charts from the latest NOAA electronic navigation chart data. Once fully operational, the NOAA Custom Chart will provide an easy way to create a paper backup for electronic chart systems or other GNSS enabled chart displays.

  Up-to-date maps of our coastal areas and accurate positioning data is crucial for economic reasons and national security. In particular, only 56 percent of Alaska's Arctic and sub-Arctic seafloor has been surveyed to the standards to meet nautical charting requirements. Additionally, there are over 20 gaps in water level coverage, which supports foundational vertical reference datums used for mapping products in Alaska's Arctic. To address these gaps, a renewed focus to map the coast of Alaska will meet critical needs for coastal mapping data including bolstering the shipping and fishing economy through safer maritime navigation, ensuring more resilient coastal economies, and data-driven coastal infrastructure development, among others.
- **Navigation Response Teams (NRTs) and Regional Services:** NRTs conduct hydrographic surveys in shallow waters and busy port areas. They also conduct rapid response surveys after maritime emergencies and natural disasters, minimizing costly impacts of port closures and draft restrictions. In 2020, NRTs responded to four named Hurricanes (Laura, Sally, Delta, Zeta) and conducted hydrographic surveys to reopen the ports of Houston-Galveston (TX), Lake Charles (LA), Pensacola (FL), and Gulfport (MS). NOAA updated its nautical charts in less than 24 hours to help safely reopen the port. NOAA regional navigation managers engage with customers and stakeholders to improve NOAA's responsiveness to their charting and navigation needs. In April 2020, the Northeast Navigation manager coordinated with the USCG's Captain of the Port in New York City and the Marine Chart Division to support the arrival of the U.S. Navy Ship *Comfort* in New York City.
- **Tide and Tidal Current Predictions:** NOAA maintains and updates the official U.S. tide and tidal current predictions, with over 3,000 entries each. The predictions are available online and include the most accurate, up-to-date and location specific information[5]. The U.S. Coast Guard has recently accepted electronic versions of the tables to meet its navigation carriage

[5] https://tidesandcurrents.noaa.gov/noaacurrents/Regions and https://tidesandcurrents.noaa.gov/tide_predictions.html

requirements for large vessels. NOAA also uses real-time observations, meteorological forecasts, and astronomical predictions to produce forecasts and "nowcasts" (predictions of current conditions where there are gaps in real-time observations) of tides, currents and other oceanographic parameters.

- **Tide and Water Level Datums:** Tide and water level datums are standard elevations used to reference water level heights and depths on NOAA Nautical charts. The National Tidal Datum Epoch is a 19-year time period established by NOS for collecting water level observations and calculating tidal datum values (e.g. Mean Sea Level, Mean Lower Low Water, and Mean High Water). It needs to be regularly revised to account for long-term effects of land movement, sea level rise, and changes in tidal constituents. Tidal datums are used to generate products and services necessary for safe navigation, coastal hazard mitigation, ecosystem research, coastal engineering, and marine boundary demarcations. The International Great Lakes Datum (IGLD) is a common reference system used to measure water level heights throughout the Great Lakes, their connecting waterways, and the St. Lawrence River System. A common system is needed for marine navigation, water level regulation, water management, surveying, mapping, and shoreline use planning. Established in 1955, and updated every 25-30 years, the IGLD is a binational effort between the United States and Canada that ensures cohesive water management in eight states and two provinces. The IGLD is managed by a binational group of Federal scientists known as the Coordinating Committee on Great Lakes Basic Hydraulic and Hydrologic Data and its Vertical-Control Water-Levels Sub-Committee.
- **Applied Research and Development:** NOAA supports research and development on the cartographic, hydrographic and oceanographic sciences that underpin the mapping mission. This research and development leads to new survey technologies, models, and geospatial products and services. For example, NOAA's Coast Survey Development Lab upgraded the Global Extratropical Surge and Tide Operational Forecast System to provide high resolution water level forecast guidance including storm tide for the entire globe. Joint Hydrographic Center develops remote sensing technologies and processes to improve data acquisition, processing, and charting. It also supports the definition of the U.S. Extended Continental Shelf and sovereign rights beyond 200 nautical miles.
- **Shoreline Mapping:** The Coastal Mapping Program defines the Nation's 95,000-mile shoreline and near-shore bathymetry. These data are essential for nautical charts and the determination of U.S. maritime boundaries such as the EEZ. These data are also used for other applications, such as inundation modeling, benthic habitat mapping, marine debris detection, and coastal zone management. NOAA maps the shoreline with tide coordinated, geo-referenced data from aerial photographs, high-resolution satellite imagery, and aerial topobathy lidar. Lidar has the ability to provide shallow water bathymetry in areas difficult and dangerous to survey by boat. Coastal Mapping equipment and personnel are also used to collect post-event (hurricane, flooding, tornado, etc.) aerial imagery to assess damage and support emergency response efforts.
- **Physical Oceanographic Real-Time System (PORTS®):** PORTS® is a public-private partnership that provides users with data from real-time environmental observations, nowcasts, and forecasts to facilitate safe marine navigation and other uses. The program is described further under "Tides and Currents activities" below.

- **Precision Marine Navigation:** Precision Marine Navigation is a coordinated effort amongst NOAA programs and partners to integrate NOAA marine navigation datasets and address port-specific requirements, including updated navigational charts, high resolution bathymetry, real-time oceanographic and geospatial observations, and hydrographic models that forecast key conditions such as surface currents and water levels days in advance. NOAA is currently developing Precision Marine Navigation projects for several locations. This program will help foster a safer and more efficient U.S. marine transportation system and can lead to fewer accidents, reduced emissions, and substantial cost savings by improving decision-making support tools. In FY 2020, NOAA released a prototype data dissemination and processing system that leverages new data formats for testing and feedback by industry partners and software developers. It is available publicly through the NOAA Big Data Program and allows for the integration of prototype data into navigation software systems. In FY 2021, NOAA is releasing a web mapping application that enables users to discover and visualize the prototype data as it becomes available, and is launching a national dissemination website that provides all of NOAA's navigation data in one location.

NOAA's work in the Port of Long Beach is a prime example of how innovation and public-private partnerships can lead to the next generation of marine transportation infrastructure. In 2015, NOAA collaborated with public, private, and academic partners and end users to pilot Precision Marine Navigation through the development of a third-party custom under keel clearance prediction system. The system, relying on high-resolution foundational data and observations from NOAA-supported assets, has enabled port authorities to ease vessel draft restrictions from 65 feet to 66 feet in 2016, to 67 feet in 2017, and to 69 feet in 2018. At 69 feet of draft, offshore lightering – a major driver of cost and safety and environmental risks – is no longer required. The project at the Port of Long Beach proved the importance of the Precision Marine Navigation program, and NOAA is currently developing projects for several locations, including the ports of New York/New Jersey and the five ports making up the lower Mississippi River. In FY 2020, NOAA completed a Precision Navigation Socioeconomic Study, which determined which ports would benefit from implementing Precision Marine Navigation, and which NOAA is using to prioritize its efforts. Additionally, through the national dissemination site, NOAA will be able to provide integrated data at a much broader set of ports. The 2022 Budget begins the process of addressing the climate crisis. As outlined in Executive Order 14008, Tackling the Climate Crisis at Home and Abroad, NOAA will evaluate this program to identify the appropriate actions the agency can take to support this policy objective in the 2023 Budget.

NOS produces critical oceanographic observations and forecasts through two main program groups: the Tides and Currents Data Program and the IOOS. These observing programs are core components of the information infrastructure that makes safe navigation and accurate positioning possible in marine environments. In addition, emergency response and management agencies use NOS's oceanographic observations to inform their responses to oil spills, storms, tsunamis and other coastal hazards.

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The Tides and Currents Data Program operates two primary coastal observing programs that the maritime community relies upon for safe and efficient navigation: the National Water Level Observation Network (NWLON) and the National Current Observation Program. NOAA's infrastructure and expertise with these two systems are essential to operating NOAA's PORTS®.

NOAA's Tides and Currents activities include:

- **Water Level Observations:** The NWLON consists of over 200 long-term, continuously operating water level stations throughout the coastal U.S., the Great Lakes, and island possessions and territories. The NWLON provides real-time information and high frequency data supporting safe and efficient maritime navigation as well as National Weather Service tsunami and storm surge watches and warnings. It also provides long-term datasets such as sea level and lake level trends that are used to develop seasonal and annual high tide flooding outlooks. NWLON data are also used to update Tide Predictions (https://tidesandcurrents.noaa.gov/tide_predictions.html). NWLON provides the framework for the national tidal datum network. Reference datums (such as the IGLD or Mean Lower Low Water) are essential for a variety of uses: navigation products, vertical control for the dredging of federally maintained channels, and shoreline and marine boundaries. Additional applications of water level information include habitat restoration, emergency management, climate adaptation related to sea level rise, coastal planning and management, and construction projects. The NWLON is one of the top 15 high-impact, high-benefit earth observing systems out of over 360 government earth-observing systems assessed by the National Plan for Civil Earth Observations.[6]
- **Current Observations:** The National Current Observation Program collects, analyzes, and disseminates predictions of tidal currents for navigation products and hazardous materials response. NOAA acquires data through deployments of current surveys of varying sampling durations. Channel dredging and changes in the configuration of ports and harbors over time significantly alter the physical oceanography of many coastal areas, thereby necessitating continuous surveying to maintain data accuracy. The principal products generated by this program are tidal current predictions, published on the NOAA Current Predictions website (https://tidesandcurrents.noaa.gov/noaacurrents/Regions), and raw observations that are provided to universities, engineers, and hydrodynamic modelers to validate models and improve the understanding of bay and estuarine circulation. NOAA is planning a current survey of the Delaware River and Bay in FY 2021 and a survey of the Columbia River during FY 2022 and FY 2023.
- **Modeling and Forecasting:** NOAA operates 15 regional forecast and nowcast models to produce predictions of future conditions and interpolated data where direct observations are not available. The National Operational Coastal Modeling Program develops and maintains a national network of operational forecast systems. These forecasts inform decision making, particularly for vessel transit planning and execution, and support issuing of special marine weather statements to alert ships

[6] United States Group on Earth Observations, National Plan for Civil Earth Observations, Washington, DC: Office of Science and Technology Policy, July 2014, p. 40-41.

at risk of grounding. The models are incorporated into various platforms like the Precision Marine Navigation Dissemination System and the Coastal Inundation Dashboard. The Coastal Inundation Dashboard is an online tool that provides real-time, forecast, and historical water level information to understand near-term inundation risks, such as impacts from tropical cyclones or nor'easters, and longer-term risks, such as high tide flooding and sea level rise. These operational forecasts are also the engine for ecological forecasts of HABs and other ecological hazards. NOAA operationalized models for the West Coast shelf and upgraded the Northern Gulf of Mexico model in FY 2021.

- **Coastal Hazard and Climate Decision Support** - NOAA provides real-time water level observations to support coastal hazard and climate decision support through the Coastal Inundation Dashboard (https://tidesandcurrents.noaa.gov/inundationdb/) and the Tsunami Capable Tide Stations (https://tidesandcurrents.noaa.gov/tsunami/). These applications support situational awareness related to coastal hazard event response (e.g., coastal storms, hurricanes, and tsunamis) as well as tracking changing water levels due to climate. Climate-oriented data products include sea level trends, extreme water levels and high tide flooding bulletins and annual outlooks to support coastal communities understanding coastal flood risk. Tsunami Capable Tide Stations focus on water level stations equipped with hardware and software to enable collection and dissemination of 1-minute water level data, which provides easier detection of tsunami signals as part of our national tsunami warning system.
- **PORTS®:** PORTS® provides real-time information to help mariners navigate safely and efficiently among U.S. seaports. For example, four current meters were installed on Aids-to-Navigation buoys at the entrance to St. Mary's River and in the Cumberland Sounds in Southern Georgia in 2020. These current meters provide real-time data to allow U.S. Navy pilots to safely navigate vessels and Ohio-class submarines to and from the nearby Kings Bay Submarine base. PORTS® systems in operation serve 80 of the busiest seaports in the Nation. Individual systems are designed to meet local needs with site-specific data and sensors; systems typically provide water levels, currents, salinity and meteorological data (e.g., wind, atmospheric pressure, visibility, and air and water temperatures) with some locations including sensors for waves and bridge clearance. PORTS® is a cost-shared program; local partners (for example: port authorities, pilot associations, marine exchanges, and Federal partners such as the Department of Defense and U.S. Army Corps of Engineers) provide funding for the system equipment and ongoing maintenance. NOAA provides technical expertise for systems design, 24/7 data quality control, data management and dissemination infrastructure, and ongoing data management. In FY 2020, NOAA implemented several enhancements to New York/New Jersey Harbor, Tampa Bay, and Cape Cod PORTS®, and two new PORTS® became operational at Kings Bay, GA and Portsmouth, NH in August 2020. The PORTS® program now provides real-time observations for all of the Nation's top 20 seaports by tonnage. In the first part of FY 2021, a new Valdez, AK PORTS® was brought online. Additionally, several enhancements were implemented in Corpus Christi, TX PORTS®. A new PORTS® around the Kitsap Peninsula, WA will become operational in FY 2022.

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The U.S. Integrated Ocean Observing System
U.S. IOOS is a national-regional partnership that provides critical ocean, coastal, and Great Lakes data, models, forecasts, and visualization tools to improve safety, support coastal resilience against climate change, enhance the economy, and protect our environment. Integrated information is available to users and stakeholders in coastal communities in near real time, as well as retrospectively, in order to support local decision making and management activities. Easier and better access to this information is improving our ability to understand and predict coastal events as well as longer term trends driven by climate change - such as hurricane intensity, water chemistry, impacts to marine and protected areas, wave heights, and sea level change.

NOAA's U.S. IOOS Office serves the dual functions of: 1) providing technical and funding support for non-federal regional observing systems and; 2) improving compatibility between Federal and regional observations. By enhancing the accessibility and interoperability of ocean data, IOOS enables users of ocean data (modelers, researchers, climate scientists, meteorologists, and others) to focus their resources on developing products. IOOS observing platforms, data management, data assimilation, and predictive systems include observations by NOS and NOAA assets, and partner networks which are improving operational oceanography for the Nation and the Global Ocean Observing System. The integration of private sector, academic, Federal, and non-profit data provided by IOOS is a highly leveraged and effective service already being used to understand and respond to our changing climate and coastal conditions.

The NOAA-certified IOOS RAs support observing requirements of local communities and complements Federal ocean observations and models. Data coming from all IOOS partners now adheres to common Federal collection, storage and management standards, meaning it can be integrated with other data, and help make "big data" research and development possible. NOAA supports IOOS RAs through cooperative agreements for operations and maintenance, capital projects, and new sensor technology. IOOS RAs deploy observing assets, contribute towards advancements in modeling and data integration, and produce stakeholder-specific products and tools in accordance with nationally coordinated build-out plans, which identify highest-priority gaps and needs.

Recent focuses for investment include:

- **Observing Assets:** National build-out of research and observing infrastructure including buoys, gliders, coastal high frequency radar, animal telemetry (data from electronic tags attached to marine animals) and models to support hurricane storm surge, inundation and intensity forecasting; HAB forecasting; climate change science and impact mitigation; marine life monitoring that includes biodiversity studies, ecosystem changes, living marine resources, and Marine Protected Areas (MPA) management; marine navigation, and more.

- **Research and Development:** The Ocean Technology Transition program supports research, development, testing, and evaluation of new sensor technology and observing strategies to aggressively evolve our ability to understand how climate change is impacting the ocean domain.
- **Advances in Modeling and Ocean Prediction:** The Coastal and Ocean Modeling Testbed, an extramural program among the research community and IOOS RAs designed to develop, test, and transition advances in experimental and operational models and forecasts. IOOS led the early development of ocean models that grew into new or improved operational forecast systems, for example the West Coast Operational Forecast System. These advanced, operational forecasts allow communities to better understand and prepare for extreme weather events, climate change, and coastal inundation.

Positioning and Geodesy

NOAA's Geodesy program defines and maintains the National Spatial Reference System (NSRS), the common reference framework for all geospatial data and positioning activities in the Nation. Accurate positioning underpins all transportation and infrastructure activity in the Nation, as well as all NOAA's earth observations and mapping activities. The foundational elements of this coordinate system—latitude, longitude, elevation, scale, gravity, and orientation – and their changes over time are essential to mapping, navigation, flood risk determination, infrastructure, transportation, land use, and ecosystem management. NOAA's authoritative spatial data, models, and tools are vital for the protection and management of natural resources and built infrastructure.

NOAA improves the quality and accessibility of the NSRS by participating in the development of international geodetic standards and guidelines. NOAA is modernizing the NSRS to improve the accuracy and accessibility of the current reference frame for stakeholders. The current reference frame was created prior to GNSS-technology and contains height errors ranging from 16 inches to 6 feet relative to sea level. When the NSRS Modernization is complete, these elevation errors will be reduced to just under an inch. This improved accuracy has big implications for applications that require accurate heights including understanding vertical land motion and sea level rise trends and creating floodplain maps and inundation models. In addition, emergency managers use accurate heights to plan and monitor evacuation routes. Coastal Managers use accurate height information to build infrastructure to prepare for increased floods. Beyond coastal communities, farmers use GNSS applications that rely on the NSRS to improve crop yields and mariners use GNSS to position ships in navigation channels. In the future, autonomous vehicles will use GNSS to navigate the air, land, and sea.

A 2009 study estimated that the NSRS provides more than $2.4 billion in potential annual benefits to the national economy[7]. The estimated economic benefits of the NOAA CORS network (described below) alone were $758 million per year. The same study

[7] Socio-Economic Benefits Study: Scoping the Value of CORS and GRAV-D, Leveson, 2009.

estimated that a new geoid-based vertical reference system through the GRAV-D initiative would yield $522 million in annual economic benefits, with approximately $240 million from improved floodplain management alone.

The NOAA Geodesy program is modernizing the NSRS and is composed of four major elements:

- **NOAA CORS and Reference Frames:** CORS are a publicly available network of permanent GNSS receivers that enable highly accurate positioning relative to the NSRS for surveyors and engineers. NOAA is working to establish a network of NOAA-owned CORS (known as Foundation CORS) using the most modern GNSS receivers and antennas, which will enhance the connection of the NSRS to the International Terrestrial Reference Frame (ITRF), creating a more consistent worldwide spatial reference frame to improve forecasts of global sea level rise and inform coastal infrastructure planning. NOAA analyzes GNSS satellites and ground station positions daily to ensure precise orbits of GNSS satellites. NOAA also maintains a network of over one million permanent geodetic survey marks as part of the NSRS.
- **Gravity Program:** NOAA's Gravity Program leads the Nation's efforts to enhance the vertical aspect of the NSRS through its GRAV-D initiative. GRAV-D is a long-term project to collect airborne gravity data and build the Nation's gravimetric geoid model. GRAV-D will ultimately reduce height errors in the current vertical datum [reference frame] from feet to just under an inch using GNSS data alone. This system can help communities improve resilience by determining where water flows, allowing them to make accurate inundation models and floodplain maps. In 2019, a socio-economic study found that the NGS Gravity Program alone is worth between $4.2 billion and $13.3 billion over ten years, with a middle scenario of $8.7 billion[8].
- **Data Access and Tools:** NOAA provides access to geodetic, shoreline, and aerial survey data, including data from partner organizations through a variety of tools and models. By storing information in geospatial databases and delivering it through open-access mapping applications, NOAA ensures surveyors and other professionals - as well as the general public - can easily access, process and download millions of data files every year. These accessible platforms also make sure that mission critical datasets - like lidar collected to delineate the shoreline - are available to researchers and other professionals. With the burgeoning amount of geospatial data collected through new technology, both government and commercial entities must ensure both old and new information is georeferenced to a consistent reference frame. NGS tools ensure that older data can be preserved and utilized in conjunction with data we collect today and in the future. In short, all of these publicly accessible tools and models are crucial to scientific and commercial positioning activities.
- **Research, Capacity Building, and Outreach:** NOAA researches and develops standards, guidelines, and best practices for the surveying and positioning industry. This includes well-established line-of-site surveying practices; it has also expanded to include modern space-based positioning technology; and it continues to develop with new or emerging technologies - like unmanned vehicles and cloud-computing. As a world leader in geodetic research and operations, NOAA is planning to build

[8] Scaling the Heights: Socio-Economic Study of the NGS Gravity Program, Leveson, 2019

in-house capacity, in conjunction with our NGA partners, to broaden and transfer required geodetic competencies and skillcraft for the US National interest. In a recent NOAA/NGA/Academia partnership, we are educating the current workforce in emerging technologies and building a new NOAA geodetic workforce to support NOAA's modernization efforts. NOAA's vision to build workforce capacity and capability will lead to a modernized workforce needed for mid-century positioning needs. As part of its outreach efforts, NOAA conducts workshops and hosts constituent forums around the country, and NOAA directly engages with industry partners that build on NGS products, making our data, tools, and science accessible to even more users in the surveying, engineering, and even agricultural sectors. In 2019, for example, NOAA hosted a Geospatial Summit attended by hundreds of stakeholders to learn about the planned modernization of the NSRS and how it will benefit public safety and the economy. This summit is being run virtually in FY 2021, building on years of experience of hosting virtual events to make sure stakeholders from every state and territory have access to NGS products and services. NOAA also runs the Regional Geodetic Advisor Program which provides training and assistance to state and local geodetic and survey programs, GIS users, and coastal managers. A 2018 study estimated the economic benefits of the Regional Geodetic Advisor Program to be between $18.6 million and $39.7 million annually[9].

[9] Scoping the Value of the Regional Geodetic Advisor Program , Leveson, 2018

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		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Navigation, Observations and Positioning	Pos./BA	636	164,105	656	174,105	20	10,000
	FTE/OBL	603	164,105	618	174,105	15	10,000

Modernizing NOAA's Foundational Geospatial Positioning Framework and Water Level Observations for Climate Decision Support (+$10,000, 15 FTE/20 Positions) – NOAA requests additional funding to ensure accurate and consistent land and water reference datums, secure the integrity of the NWLON, and modernize the NSRS. The resulting accurate national water level models, real-time inundation alerts, high tide flooding outlooks, and long-term sea level trends will provide authoritative information for climate decision support, ensuring that actionable information is delivered regarding coastal water levels. Funds will be distributed in the following ways:

- $4,500 to advance modernization of the NSRS. This will provide the land-height reference framework for all GIS applications, coastal inundation models, floodplain maps, and GIS applications, and will correct meter-level errors in vertical positioning data in the current reference frame to centimeter-level errors, a one hundred fold increase in accuracy. This modernization will support better integration of vertical land motion into climate and resilience planning. NOAA's NGS will spend $2,000 to support accurate airborne gravity collection and geoid model development; $1,000 to modernize foundational IT systems through cloud data management, tool development, Artificial Intelligence, and service delivery; and $1,500 to expand the number of Foundation CORS, NOAA's federally-managed network of GNSS-enabled stations.

- $5,500 to expand, modernize, and recapitalize the NWLON and its supporting IT systems to ensure the ongoing reliability and accuracy of water level observations, from which authoritative tidal and water level vertical reference datums are derived. NOAA's CO-OPS will spend $3,100 to restore comprehensive annual maintenance and maintain a state of continual operational readiness by regularly recapitalizing infrastructure at all 210 NWLON stations and implementing a highly-efficient Artificial Intelligence approach to water level data processing; $400 to fill the 10 most critical gaps in water level data by enhancing the reliability and accuracy of existing water level stations operated by Federal and state partners; and $2,000 to complete the transition to microwave water level sensors and establish a consistent nearshore waves height measurement capability at NWLON stations, addressing a significant national gap in wave measurements in shallow nearshore coastal

areas. NOAA will transition into operations the methodology required to dual-purpose these microwave water level sensors to also observe wave heights, expand existing IT infrastructure to ingest and process wave observations, and provide user-validated wave products disseminated through a 24/7 real-time operational oceanographic capability.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022 – 2026

- Incorporate Artificial Intelligence/machine learning models into software (FY 2022)
- Collect GRAV-D data in Alaska and Pacific Islands (FY 2022)
- Complete engineering design, test and evaluation of microwave radar water level sensor and data collection platform upgrade to enable real-time wave measurements at NWLON stations (FY 2022-2023)
- Implement GIS tools leveraging Cloud infrastructure (FY 2022-2024)
- Expand Foundation CORS Network by building new stations, adopting high-quality stations from Federal partner networks, and upgrading stations to the strict International GNSS Service standard, and conducting maintenance (FY 2022-2025)
- Establish Geoid Monitoring Program to maintain a zero elevation surface equivalent to mean sea level (FY 2022-2026)
- Support climate decision support by filling one critical gap in the NWLON through partnerships with mission-aligned Federal and state agencies per year (FY 2022–2026)
- Improve systematic NWLON recapitalization to maintain a state of continual operational readiness (FY 2022-2026)
- Conduct comprehensive annual NWLON maintenance (FY 2023)
- Develop an automated quality assurance/quality control, data processing, and wave height measurement dissemination capability (FY 2024-2025)

Deliverables:

- Completed GRAV-D collection in U.S. and territories and produce a highly-accurate gravity-based geoid based on the resulting GRAV-D data
- A highly scalable version of Online Positioning User Service in the Cloud
- Operational Foundation CORS Network with expanded capacity to a network of 36 Foundation CORS by FY 2025
- Operational Geoid Monitoring Program

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- Comprehensive annual NWLON maintenance at 210 NWLON stations met and sustained, and a state of continual operational readiness for the NWLON over decadal time frames met through comprehensive station recapitalization
- A highly-efficient Artificial Intelligence approach implemented for quality control and data processing of NWLON water level observations
- Ten of the most critical gaps in the NWLON filled in order to advance climate decision support
- Microwave water level sensors installed at 150 NWLON stations
- Real-time wave height observations and associated public data services (APIs) available at 150 NWLON locations
- Waves information integrated into climate decision support tools, real-time flood alert tools (NOAA Coastal Inundation Dashboard), NOAA PORTS® products for safe navigation, and rip current forecasting models and warnings

Performance Measures	2022	2023	2024	2025	2026
Percent of U.S. and territories surveyed to improve vertical reference system for modernized height/elevation data (cumulative)					
With Increase	93%	100%	100%	100%	100%
Without Increase	88.5%	95%	100%	100%	100%
Number of comprehensive scheduled maintenance conducted annually at NWLON stations					
With Increase	190	210	210	210	210
Without Increase	160	160	160	160	160
Outyear Costs:					
Direct Obligations	10,000	10,000	10,000	10,000	10,000
Capitalized	0	0	0	0	0
Uncapitalized	10,000	10,000	10,000	10,000	10,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Budget Authority	10,000	10,000	10,000	10,000	10,000
Outlays	6,200	6,200	6,200	6,200	6,200
FTE	15	20	20	20	20
Positions	20	20	20	20	20

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Navigation, Observations and Positioning
Subactivity: Navigation, Observations and Positioning
Program Change: Modernizing NOAA's Foundational Geospatial Positioning Framework and Water Level Observations for Climate Decision Support

Title		Grade	Number	Salary	Salaries
Physical Scientist		ZP-04	1	159,000	159,000
Physical Scientist		ZP-03	2	113,000	226,000
General Engineer		ZP-03	1	113,000	113,000
IT Specialist		ZP-04	4	159,000	636,000
IT Specialist		ZP-03	3	113,000	339,000
Oceanographer		ZP-04	2	159,000	318,000
Oceanographer		ZP-03	2	113,000	226,000
Geodeist		ZP-03	2	113,000	226,000
Electronic Technician		ZP-03	1	113,000	113,000
Land Surveyor		ZP-03	1	113,000	113,000
Land Surveyor		ZP-03	1	113,000	113,000
Total			20		2,582,000
Less lapse	25.00%		(5)		(645,500)
Total full-time permanent (FTE)			15		1,936,500
2022 Pay Adjustment (2.7%)					52,286
					1,988,786

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	15
Total FTE	15
Authorized Positions:	
Full-time permanent	20
Total Positions	20

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Navigation, Observations and Positioning
Subactivity: Navigation, Observations and Positioning

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	76,333	41,814	44,569	46,558	1,989
11.3	Other than full-time permanent	87	0	0	0	0
11.5	Other personnel compensation	1,155	1,584	1,583	1,583	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	77,575	43,398	46,152	48,141	1,989
12	Civilian personnel benefits	25,559	22,739	24,428	25,184	756
13	Benefits for former personnel	6	0	0	0	0
21	Travel and transportation of persons	1,500	1,613	1,612	1,912	300
22	Transportation of things	406	346	346	446	100
23	Rent, communications, and utilitites	10,618	8,548	8,544	8,544	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	13	17	17	17	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	32,291	59,902	59,966	66,221	6,255
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,937	2,728	2,727	2,927	200
31	Equipment	5,870	717	716	1,116	400
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	24,870	19,605	19,597	19,597	0
42	Insurance claims and indemnities	2	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
77	Overhead	12,670	0	0	0	0
99	Total obligations	193,317	159,613	164,105	174,105	10,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Navigation, Observations and Positioning	Pos./BA	618	164,105	631	169,105	13	5,000
	FTE/OBL	585	164,105	595	169,105	10	5,000

Building Climate Outlook Capabilities into a Next-Generation Coastal Inundation Dashboard (+$5,000, 10 FTE/13 Positions) – NOAA requests additional funding to create a national operational climate inundation outlook by integrating and operationalizing high tide flood, sea level trend, and vertical land motion information into one capability. This new Next Generation Coastal Inundation Dashboard will enable coastal decision-makers to evaluate their flood risk at a local level and at varying timescales. It will leverage the accurate national water level models, vertical and land motion measurements, wave observations, and long-term sea level trends resulting from the Modernizing NOAA's Foundational Geospatial Positioning Framework and Water Level Observations request (NOS-23), and bring together authoritative products derived from long term, high quality NWLON observations. These include State of High Tide Flooding and Annual Outlook reports, High Tide Bulletin, Sea Level Trends Online, Inundation Analysis, and Extreme Water Levels. In doing so, NOAA will create equitable access to climate inundation information, producing 2-D spatially enabled flood data and products at climate timescales down to at least the county level, and putting that into a publicly available interface. Funding will be spread across the following activities:

- $2,500 for research and development and data/model analysis
- $750 for research to operations transition through a cloud-based environment
- $750 for IT infrastructure and data management
- $1,000 for inundation mapping, decision support and service delivery.

As coastal inundation continues to increase due to sea level rise, local land subsidence (vertical land motion), and the loss of natural flood barriers, this enhanced capacity will provide authoritative data, maps, and reliable and timely climate inundation outlooks, pinpointing what days high tide flooding is anticipated and where flood risk will impact community transportation, commerce and other essential functions. This request is part of a larger NOAA-wide strategy, Capability for Coastal Flooding and Inundation Information and Services as Climate Timescales to Reduce Risk and Improve Resilience.

Department of Commerce
National Oceanic and Atmospheric Administration
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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022 – 2026

- Merge the first generation high tide bulletin, state of high tide report and outlook generated at tide gauge locations into a single, integrated product into the Coastal Inundation Dashboard (FY 2022 - FY 2023)
- Develop relative sea-level rise trends and projections that include vertical land motion at tide gauges (FY 2022 - FY 2023)
- Integrate partner in situ coastal water level observations and citizen science-based impact graphics into the Coastal Inundation Dashboard to display on the ground flood impacts from high tide flooding caused by localized relative sea level rise/vertical land motion and extreme events (FY 2022 – FY 2026)
- Conduct geospatial analysis and inundation mapping to produce downscaled coastal inundation impacts and develop satellite derived gridded vertical land motion maps (FY 2022 – FY 2026)
- Enhance existing impact based thresholds to better account for local topography and infrastructure. Automate flood scorekeeping through nationally consistent impact-based flood thresholds (FY 2023 – FY 2025)
- Produce national 2-D gridded spatial output of probabilities related to impact-based minor, moderate and major high tide flooding and operationalize these predictions into national climate outlook products (FY 2023 – FY 2026)
- Integrate national climate outlook product and improved geospatial information into the Coastal Inundation Dashboard to create a next generation product that contains climate outlook information alongside historical (i.e. sea level trends) and real-time water level information (FY 2026)
- Initiate coupling to hydrologic boundary conditions from the NOAA Water Model into coastal models to produce sub-seasonal prediction and projections of total water levels (FY 2026)

Deliverables:

- National operational and spatially enabled coastal inundation outlooks disseminated on consistent and reliable timeframes (starting in FY 2023)
- Improved inundation and vertical land motion maps and visualizations of coastal inundation risk (starting in FY 2023)
- Next Generation Coastal Inundation Dashboard with climate outlook capabilities (starting in FY 2023)

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Percent of Coastal Watershed Counties with a 2-D gridded National Operational Climate Inundation Outlook					
With Increase	0	15	30	45	60
Without Increase	0	0	0	0	0
Percent of Coastal Watershed Counties with Coastal Inundation and Vertical Land Motion Maps					
With Increase	0	20	40	60	80
Without Increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	5,000	5,000	5,000	5,000	5,000
Capitalized	0	0	0	0	0
Uncapitalized	5,000	5,000	5,000	5,000	5,000
Budget Authority	5,000	5,000	5,000	5,000	5,000
Outlays	3,100	3,100	3,100	3,100	3,100
FTE	10	13	13	13	13
Positions	13	13	13	13	13

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Navigation, Observations, and Positioning
Subactivity: Navigation, Observations, and Positioning
Program Change: Building Climate Outlook Capabilities into a Next-Generation Coastal Inundation Dashboard

Title		Grade	Number	Annual Salary	Total Salaries
Oceanographer		ZP-04	1	159,000	159,000
Oceanographer		ZP-03	2	113,000	226,000
Physical Scientist		ZP-04	1	159,000	159,000
Physical Scientist		ZP-03	3	113,000	339,000
IT Specialist		ZP-04	4	159,000	636,000
Social Scientist		ZP-03	1	113,000	113,000
Communications Specialist		ZA-03	1	113,000	113,000
Total			13		1,745,000
Less lapse	25.00%		(3)		(436,250)
Total full-time permanent (FTE)			10		1,308,750
2022 Pay Adjustment (2.7%)					35,336
					1,344,086

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	10
Total FTE	10
Authorized Positions:	
Full-time permanent	13
Total Positions	13

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Navigation, Observations, and Positioning
Subactivity: Navigation, Observations, and Positioning

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	76,333	41,814	44,569	45,913	1,344
11.3	Other than full-time permanent	87	0	0	0	0
11.5	Other personnel compensation	1,155	1,584	1,583	1,583	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	77,575	43,398	46,152	47,496	1,344
12	Civilian personnel benefits	25,559	22,739	24,428	24,939	511
13	Benefits for former personnel	6	0	0	0	0
21	Travel and transportation of persons	1,500	1,613	1,612	1,642	30
22	Transportation of things	406	346	346	346	0
23	Rent, communications, and utilitites	10,618	8,548	8,544	8,544	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	13	17	17	17	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	32,291	59,902	59,966	63,031	3,065
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,937	2,728	2,727	2,777	50
31	Equipment	5,870	717	716	716	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	24,870	19,605	19,597	19,597	0
42	Insurance claims and indemnities	2	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
77	Overhead	12,670	0	0	0	0
99	Total obligations	193,317	159,613	164,105	169,105	5,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Navigation, Observations and Positioning	Pos./BA	618	164,105	628	169,105	10	5,000
	FTE/OBL	585	164,105	592	169,105	7	5,000

Complete National Coastal Modeling Coverage (+$5,000, 7 FTE/10 Positions) – NOAA requests additional funding to complete its operational coastal oceanographic modeling system, providing complete continental U.S. coverage for a robust climate forecast capability. Leveraging and integrating multiple existing NOS capabilities, NOS will partner with the NWS and the non-federal extramural modeling partners to accelerate and complete its 3D hydrodynamic modeling system, benefitting coastal communities. This investment will deliver critical oceanographic forecasts, such as water levels, water temperature, salinity, and currents, and will allow equitable assessment of changing coastal conditions due to climate forcings. Models will be developed and transitioned to NOAA operations in partnership with the external modeling community through a shared cyberinfrastructure. Investments include:

- $1,750 to support community engagement, model transition, operational implementation and maintenance of the coastal modeling systems
- $1,500 to develop and maintain the shared cyberinfrastructure for the community modeling environment
- $1,750 to support dissemination of forecasts and product development
- This investment will facilitate the development of a coupled earth system model, which includes coupling with NOAA riverine models needed for total water assessments and associated predictive capabilities at the coast. Funding will support staff required to maintain the operational modeling system and support the shared cyberinfrastructure.

This request will transition and implement into operations the models developed by the external community through the Advancing Coastal and Ocean Modeling and Prediction (NOS-57) and Data Management and Cyberinfrastructure requests (NOS-44). In addition, these products will support development in operation of regional model applications for living marine resource management needs under the NOAA Climate and Fisheries Initiative.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022 – FY 2026

- Facilitate partnerships at the non-federal level to prepare and plan for enhanced coastal modeling capability (FY 2022)
- Establish shared cyberinfrastructure system with the external modeling community such that NOAA can readily assess data quality and model performance (FY 2023 - FY 2024)
- Accelerate the transition of externally-developed coastal modeling systems into operations (FY 2024 - FY 2026)
- Deliver model visualization products and forecast data dissemination capabilities to support operational coastal modeling applications (FY 2025 - FY 2026)

Deliverables:

- Regional operational modeling system for continental U.S. implemented with data assimilation capability
- New coastal models implemented into operations to address gaps in coastal coverage
- Enhancements to existing operational regional models implemented to improve model performance
- Data quality assessment tools and uncertainty metrics provided to monitor model performance
- Model forecasts disseminated to support climate decision support, coastal resilience assessments, precision navigation, and ecological applications

Performance Measures	2022	2023	2024	2025	2026
Percentage of NOS operational models supported by next-generation cyberinfrastructure shared across NOS					
With Increase	10	50	75	100	100
Without Increase	10	10	10	10	10
Outyear Costs:					
Direct Obligations	5,000	5,000	5,000	5,000	5,000
Capitalized	0	0	0	0	0
Uncapitalized	5,000	5,000	5,000	5,000	5,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Budget Authority	5,000	5,000	5,000	5,000	5,000
Outlays	3,100	3,100	3,100	3,100	3,100
FTE	7	10	10	10	10
Positions	10	10	10	10	10

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Navigation, Observations and Positioning
Subactivity: Navigation, Observations and Positioning
Program Change: Complete National Coastal Modeling Coverage

Title	Location	Grade	Number	Annual Salary	Total Salaries
Physical Scientist	Silver Spring, MD	ZP-04	4	159,000	636,000
Physical Scientist	Silver Spring, MD	ZP-03	1	113,000	113,000
IT Specialist	Silver Spring, MD	ZP-04	5	159,000	795,000
Total			10		1,544,000
Less lapse	25.00%		(3)		(386,000)
Total full-time permanent (FTE)			7		1,158,000
2022 Pay Adjustment (2.7%)					31,266
					1,189,266

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	7
Total FTE	7
Authorized Positions:	
Full-time permanent	10
Total Positions	10

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Navigation, Observations and Positioning
Subactivity: Navigation, Observations and Positioning

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	76,333	41,814	44,569	45,758	1,189
11.3	Other than full-time permanent	87	0	0	0	0
11.5	Other personnel compensation	1,155	1,584	1,583	1,583	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	77,575	43,398	46,152	47,341	1,189
12	Civilian personnel benefits	25,559	22,739	24,428	24,880	452
13	Benefits for former personnel	6	0	0	0	0
21	Travel and transportation of persons	1,500	1,613	1,612	1,642	30
22	Transportation of things	406	346	346	346	0
23	Rent, communications, and utilitites	10,618	8,548	8,544	8,544	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	13	17	17	17	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	32,291	59,902	59,966	63,245	3,279
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,937	2,728	2,727	2,777	50
31	Equipment	5,870	717	716	716	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	24,870	19,605	19,597	19,597	0
42	Insurance claims and indemnities	2	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
77	Overhead	12,670	0	0	0	0
99	Total obligations	193,317	159,613	164,105	169,105	5,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Navigation, Observations and Positioning	Pos./BA	618	164,105	625	166,105	7	2,000
	FTE/OBL	585	164,105	590	166,105	5	2,000

Fostering Ecological Resilience Through Conservation Action (+$2,000, 5 FTE/7 Positions) – This is one of three complimentary requests with the same title across NOS programs, required to convert the increasing number of observations into implementable conservation actions, and ensure that coastal communities receive the full suite of scientific support from NOAA programs and interagency partners to inform local management decisions. The complementary requests, detailing the co-development of data products and subsequent usage of observations in national marine sanctuary management, can be found in the Coastal Science, Assessment, Response and Restoration (NOS-82) and Sanctuaries and Marine Protected Areas (NOS-145) sections.

Here, NOAA is requesting additional funding to establish a Marine Life Program in IOOS that works through its observing systems to contribute to cross-Line Office vulnerability and adaptation strategies to ensure resilience of coastal communities and stability of living resources that provide coastal protection (eg corals, mangroves, macroalgae). This work, which includes increasing marine life observations and establishing a marine life data assembly center, will improve NOAA's ability to answer key management questions, and fills critical gaps in ocean observations to improve ocean and living marine resource forecasts under the NOAA Climate and Fisheries Initiative.

Together, these three increases will ensure that the IOOS, National Centers for Coastal Ocean Science, and Office of National Marine Sanctuaries can work collaboratively so that the increase in number of observations, such as those collected through the resilience grants in the Monitoring Ecological Change Through Observing Systems request (NOS-53), are met with a robust integrated process to successfully convert these into implementable conservation actions, and used to answer key management questions.

There is an increasing need for NOAA to create and foster natural and economic resilience along our coasts through support, expertise and robust, on-the-ground partnerships and place-based conservation activities. Ecological restoration and community resilience, as outlined in EO 14008, are integral to NOAA and the Administration's climate strategy.

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National Oceanic and Atmospheric Administration
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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022 – FY 2026

- Develop a coordinated plan across NOAA for observing and data targets that will inform scientific support, data synthesis, and models and tools for living marine resource management, ecosystem assessment and MPA management and decision-making, and increase marine life observing capacity based on these stakeholder needs (FY 2022)
- Establish first level capability for a unified Marine Life Data Assembly Center as well as other platforms and products to support the observing data targets and requirements assessment. (FY 2023)
- Coordinate IOOS-supported observing, data management, modeling and new technology deployments with partners to ensure appropriate data and formats are provided to users at multiple levels to manage, mitigate, or remediate (FY 2023 - FY 2026)

Deliverables:

- Establishment of a Marine Life Program within the IOOS Program Office
- Operational Marine Life Data Assembly Center that fuses the existing Marine Biodiversity Observations Network and Animal Telemetry Network Data Assembly Centers into a unified national level data aggregation, display, management and delivery Center with a scalable, state-of-the-art cyber infrastructure

Performance Measures	2022	2023	2024	2025	2026
Total number of MPA/Sanctuary/Monument sites where biodiversity and habitat condition and assessments are automatically updated with IOOS Marine Life observations					
With Increase - total if all three requests are funded	3	6	9	12	14
With Increase - if only this request is funded	3	4	5	6	7
Without Increase	3	3	3	3	3

Department of Commerce
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Operations, Research and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Outyear Costs:					
Direct Obligations	2,000	2,000	2,000	2,000	2,000
Capitalized	0	0	0	0	0
Uncapitalized	2,000	2,000	2,000	2,000	2,000
Budget Authority	2,000	2,000	2,000	2,000	2,000
Outlays	1,240	1,240	1,240	1,240	1,240
FTE	5	7	7	7	7
Positions	7	7	7	7	7

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Navigation, Observations and Positioning
Subactivity: Navigation, Observations and Positioning
Program Change: Fostering Ecological Resilience Through Conservation Action

Title		Grade	Number	Annual Salary	Total Salaries
Marine Biologist		ZP-04	1	159,000	159,000
Marine Biologist		ZP-03	2	113,000	226,000
Management and Program Analyst		ZA-04	1	159,000	159,000
Management and Program Analyst		ZA-03	1	113,000	113,000
Environmental Compliance Specialist		ZA-03	1	113,000	113,000
Financial Management Specialist		ZA-02	1	85,000	85,000
Total			7		855,000
Less lapse	25.00%		(2)		(213,750)
Total full-time permanent (FTE)			5		641,250
2022 Pay Adjustment (2.7%)					17,314
					658,564

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	5
Total FTE	5
Authorized Positions:	
Full-time permanent	7
Total Positions	7

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Navigation, Observations and Positioning
Subactivity: Navigation, Observations and Positioning

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	76,333	41,814	44,569	45,228	659
11.3	Other than full-time permanent	87	0	0	0	0
11.5	Other personnel compensation	1,155	1,584	1,583	1,583	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	77,575	43,398	46,152	46,811	659
12	Civilian personnel benefits	25,559	22,739	24,428	24,678	250
13	Benefits for former personnel	6	0	0	0	0
21	Travel and transportation of persons	1,500	1,613	1,612	1,672	60
22	Transportation of things	406	346	346	346	0
23	Rent, communications, and utilitites	10,618	8,548	8,544	8,594	50
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	13	17	17	17	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	32,291	59,902	59,966	60,398	432
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,937	2,728	2,727	2,732	5
31	Equipment	5,870	717	716	731	15
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	24,870	19,605	19,597	20,126	529
42	Insurance claims and indemnities	2	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
77	Overhead	12,670	0	0	0	0
99	Total obligations	193,317	159,613	164,105	166,105	2,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Navigation, Observations and Positioning	Pos./BA	618	164,105	625	166,105	7	2,000
	FTE/OBL	585	164,105	590	166,105	5	2,000

Data Management and Cyberinfrastructure (DMAC) (+$2,000, 5 FTE/7 Positions) – NOAA requests additional funding to enhance data management, data processing and product development integral to creating environmental data time series that can be used to analyze climate change. This increase will enable NOAA to maintain quality observation system growth and adapt to evolving data management capabilities and standards, and will provide additional support for standardized data access through publically available Data Assembly Centers. Investments in DMAC will enhance NOS' capacity to deliver climate-related information to coastal stakeholders to prepare for coastal change, including vulnerable and underserved communities. This increased capability will allow NOS to provide the system architecture support to match the increased data collection and modeling efforts resulting from the Complete National Coastal Modeling Coverage (NOS-34), and Advancing Coastal and Ocean Modeling and Prediction requests (NOS-57). These efforts will enhance regional operational forecast systems and data products for living marine resource management needs under the NOAA Climate and Fisheries Initiative.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022 – 2026

- Complete hiring of positions to enable necessary staff resources are available to complete deliverables (FY 2022 – FY 2023)
- Establish IOOS Office's Service Delivery Framework to align IOOS Regional Association stakeholder engagement expertise with NOAA's implementation (FY 2024)
- Invest in ongoing stakeholder engagement to refine models, develop tailored products and tools for climate applications, and identify fund new projects (FY 2025 – FY 2026)

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Deliverables:

- Expanded capacity to integrate climate-related observations from Federal, state, academic, industry, and non-profit partners in order to deliver standardized, quality data products, models, and predictions to national constituents, including for living marine resource management
- Data Assembly Centers adequately staffed to provide standardized access to quality climate observations and ingest expanded regional observation inputs
- Cloud-hosted data store providing data proximate computation platform and providing access to NOAA operational data flow pathways critical to earth system modeling enterprise
- Enhanced Regional IOOS expertise for stakeholder engagement and co-development of IOOS decision support products and services

Performance Measures	2022	2023	2024	2025	2026
Percentage increased efficiency to build new regional operational models[10]					
With Increase	0%	17%	33%	50%	50%
Without Increase	0%	0%	0%	0%	0%
Outyear Costs:					
Direct Obligations	2,000	2,000	2,000	2,000	2,000
Capitalized	0	0	0	0	0
Uncapitalized	2,000	2,000	2,000	2,000	2,000
Budget Authority	2,000	2,000	2,000	2,000	2,000
Outlays	1,240	1,240	1,240	1,240	1,240
FTE	5	7	7	7	7
Positions	7	7	7	7	7

[10] As of FY 2021, it takes approximately six years to build a regional operational model, represented by a 0% increase in efficiency in these performance targets.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Navigation, Observations and Positioning
Subactivity: Navigation, Observations and Positioning
Program Change: Data Management and Cyberinfrastructure (DMAC)

Title		Grade	Number	Salary	Salaries
Physical Scientist		ZP-03	4	113,000	452,000
Management and Program Analyst		ZA-03	1	113,000	113,000
Management and Program Analyst		ZA-02	1	85,000	85,000
Cooperative Programs Specialist		ZA-03	1	113,000	113,000
Total			7		763,000
Less lapse	25.00%		(2)		(190,750)
Total full-time permanent (FTE)			5		572,250
2022 Pay Adjustment (2.7%)					15,451
					587,701

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	5
Total FTE	5
Authorized Positions:	
Full-time permanent	7
Total Positions	7

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Navigation, Observations and Positioning
Subactivity: Navigation, Observations and Positioning

Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
Full-time permanent compensation	76,333	41,814	44,569	45,157	588
Other than full-time permanent	87	0	0	0	0
Other personnel compensation	1,155	1,584	1,583	1,583	0
Special personnel services payments	0	0	0	0	0
Total personnel compensation	77,575	43,398	46,152	46,740	588
Civilian personnel benefits	25,559	22,739	24,428	24,651	223
Benefits for former personnel	6	0	0	0	0
Travel and transportation of persons	1,500	1,613	1,612	1,652	40
Transportation of things	406	346	346	346	0
Rent, communications, and utilitites	10,618	8,548	8,544	8,594	50
Rental payments to GSA	0	0	0	0	0
Rental Payments to others	0	0	0	0	0
Communications, utilities and misc charges	0	0	0	0	0
Printing and reproduction	13	17	17	17	0
Advisory and assistance services	0	0	0	0	0
Other services from non-Federal sources	32,291	59,902	59,966	60,366	400
Other goods and services from Federal sources	0	0	0	0	0
Operation and maintenance of facilities	0	0	0	0	0
Research and development contracts	0	0	0	0	0
Medical care	0	0	0	0	0
Operation and maintenance of equipment	0	0	0	0	0
Subsistence and support of persons	0	0	0	0	0
Supplies and materials	1,937	2,728	2,727	2,732	5
Equipment	5,870	717	716	731	15
Lands and structures	0	0	0	0	0
Investments and loans	0	0	0	0	0
Grants, subsidies and contributions	24,870	19,605	19,597	20,276	679
Insurance claims and indemnities	2	0	0	0	0
Interest and dividends	0	0	0	0	0
Refunds	0	0	0	0	0
Overhead	12,670	0	0	0	0
Total obligations	193,317	159,613	164,105	166,105	2,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Navigation, Observations and Positioning	Pos./BA	618	164,105	618	165,105	0	1,000
	FTE/OBL	585	164,105	585	165,105	0	1,000

Enterprise Infrastructure Solutions (EIS) (+$1,000, 0 FTE/0 Positions) – This increase will enable NOAA to conduct a technology modernization and support an accelerated transition of telecommunications services to the GSA EIS contract vehicle. DOC currently uses GSA's Networx, Washington Interagency Telecommunications System 3, and regional contracts to acquire telecommunication services. These contracts expire in May 2023. Between now and then, DOC will be transitioning telecommunications services to the GSA EIS follow-on contract. Additional EIS requests can also be found in Mission Support (MS-65), NOS (NOS-88, NOS-120, NOS-149), NMFS (NMFS-71), NWS (NWS-24, NWS-127, NWS-182), NESDIS (NESDIS-37), and OMAO (OMAO-19).

The modernization enables NOAA to re-architect its network infrastructure to gain efficiencies and resilience, realize significantly reduced costs for network services after transition, and minimize risk as legacy services are discontinued. Increased funding will accelerate the transition and enable NOAA to: (a) contract for engineering services to re-architect the network infrastructure and establish detailed transition plans; (b) issue awards for new hardware and telecommunication services; (c) trench and lay new lines, decommission and provision circuits; and (d) establish funding for administrative services to provide ordering, invoice processing, and inventory management. By expediting the technology modernization and migration to the new EIS vendors, NOAA will realize significant reductions in price and cost-avoidance. This funding will reduce risks related to service delivery and operations due to termination of GSA legacy service contracts.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022 - 2026

- Award NOAA task orders under EIS to support modernization needs
- Establish a sustainable, resilient architecture to meet NOAA's current and planned needs
- Transition 100% NOAA Legacy GSA inventory to EIS

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Deliverables:

- Modernized telecommunications infrastructure capable of meeting the agency's mission
- Provide a centralized ordering and management platform
- Provide a secure infrastructure resistant to extreme weather impacts

Performance Measures	2022	2023	2024	2025	2026
Transition of NOAA Telecommunication services to GSA's EIS					
With Increase	35%	60%	80%	100%	0%
Without Increase	20%	45%	55%	65%	75%
*Assumes full funding of EIS initiatives NOAA-wide					
Outyear Costs:					
Direct Obligations	200	200	200	200	200
Capitalized	0	0	0	0	0
Uncapitalized	200	200	200	200	200
Budget Authority	200	200	200	200	200
Outlays	200	200	200	200	200
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Navigation, Observations and Positioning
Subactivity: Navigation, Observations and Positioning

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	76,333	41,814	44,569	44,569	0
11.3	Other than full-time permanent	87	0	0	0	0
11.5	Other personnel compensation	1,155	1,584	1,583	1,583	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	77,575	43,398	46,152	46,152	0
12	Civilian personnel benefits	25,559	22,739	24,428	24,428	0
13	Benefits for former personnel	6	0	0	0	0
21	Travel and transportation of persons	1,500	1,613	1,612	1,612	0
22	Transportation of things	406	346	346	346	0
23	Rent, communications, and utilitites	10,618	8,548	8,544	8,544	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	780	780
24	Printing and reproduction	13	17	17	17	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	32,291	59,902	59,966	60,186	220
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,937	2,728	2,727	2,727	0
31	Equipment	5,870	717	716	716	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	24,870	19,605	19,597	19,597	0
42	Insurance claims and indemnities	2	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
77	Overhead	12,670	0	0	0	0
99	Total obligations	193,317	159,613	164,105	165,105	1,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM DECREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Navigation, Observations and Positioning	Pos./BA	618	164,105	618	158,709	0	(5,396)
	FTE/OBL	585	164,105	585	158,709	0	(5,396)

Decrease Congressionally Directed Regional Geospatial Modeling Grants (-$5,396, 0 FTE/ 0 Positions) –NOAA proposes to decrease funding for the Regional Geospatial Modeling Grants program. With a reduction of $5,396, NOAA will provide $2,604 for this program in FY 2022. NOAA will continue to support a range of other regional geospatial requirements through NOS's Coastal Zone Management and Services and Navigation, Observations and Positioning program activities. These activities include the NSRS, CORS, data access, and capacity building.

Direct Obligations	(5,396)	(5,396)	(5,396)	(5,396)	(5,396)
Capitalized	0	0	0	0	0
Uncapitalized	(5,396)	(5,396)	(5,396)	(5,396)	(5,396)
Budget Authority	(5,396)	(5,396)	(5,396)	(5,396)	(5,396)
Outlays	(3,100)	(3,100)	(3,100)	(3,100)	(3,100)
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Navigation, Observations and Positioning
Subactivity: Navigation, Observations and Positioning

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Decrease from 2022 Base
11.1	Full-time permanent compensation	76,333	41,814	44,569	44,569	0
11.3	Other than full-time permanent	87	0	0	0	0
11.5	Other personnel compensation	1,155	1,584	1,583	1,583	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	77,575	43,398	46,152	46,152	0
12	Civilian personnel benefits	25,559	22,739	24,428	24,428	0
13	Benefits for former personnel	6	0	0	0	0
21	Travel and transportation of persons	1,500	1,613	1,612	1,612	0
22	Transportation of things	406	346	346	346	0
23	Rent, communications, and utilitites	10,618	8,548	8,544	8,544	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	13	17	17	17	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	32,291	59,902	59,966	59,966	0
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,937	2,728	2,727	2,727	0
31	Equipment	5,870	717	716	716	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	24,870	19,605	19,597	14,201	-5,396
42	Insurance claims and indemnities	2	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
77	Overhead	12,670	0	0	0	0
99	Total obligations	193,317	159,613	164,105	158,709	-5,396

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
IOOS Regional Observations	Pos./BA	0	40,500	0	55,500	0	15,000
	FTE/OBL	0	40,500	0	55,500	0	15,000

Monitoring Ecological Change Through Observing Systems (+$15,000, 0 FTE/0 Positions) – NOAA requests additional funding to provide grants to external partners that expand the collection of marine life observations, support analysis of marine life data and information products, and forecast the implications of climate change on living resources and ecosystems. IOOS RAs will provide critical support for the U.S. Marine Biodiversity Observation Network, a collaboration between NOAA, the National Aeronautics and Space Administration, the Bureau of Ocean Energy Management, and the Animal Telemetry Network, which is focused on understanding the life histories of endangered, threatened, and commercially harvested marine resources in a changing ocean. These funds will be awarded to teams and projects that emphasize enhancing observations, data management and co-developed data products to: characterize and monitor marine ecosystems and living resources; understand and predict impacts from climate change; prioritize and synthesize long-term data collections; advance technologies for biological observing (e.g. 'omics, sound, optical and autonomous methods, Artificial Intelligence/Machine Learning); and develop targeted modelling, web-enabled ecosystem trends, and other tools to inform adaptation strategies. This investment is foundational to executing vulnerability and adaptation strategies across NOAA to ensure resilience and stability of living resources and the coastal communities that derive coastal protection and economic benefit from them, and to place-based and ecosystem-based management of living resources and habitats.

Execution of this work, including grant-making and substantial involvement in the cooperative agreements to ensure the above goals that is included in this request. Funding this work is critical to fill gaps in ocean observations to improve ocean and living marine resource forecasts under the NOAA Climate and Fisheries Initiative

There is an increasing need for NOAA to create and foster natural and economic resilience along our coasts through support, expertise and robust, on-the-ground partnerships and place-based conservation activities. Ecological restoration and community resilience, as outlined in EO 14008, are integral to NOAA and the Administration’s climate strategy.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022 – FY 2026

- Coordinate across NOAA to develop a plan that ensures externally-awarded funds for marine life observing are based on identified needs to best support the scientific and modeling requirements for successful climate-based living marine resources management (FY 2022)
- Issue funds to data management and product development partners to establish first level capability for a unified Marine Life Data Assembly Center (DAC) as well as other platforms and products that support the observing data targets and requirements assessment (FY 2023)
- Coordinate with external partners on observing, data management, and modeling activities, and new technology deployments to ensure appropriate data and formats are provided to users at multiple levels to manage, mitigate, or remediate (FY 2023 – FY 2026)

Deliverables:

- Implementation of expanded marine life observing capabilities and capacity to inform decision support, ecosystem assessment and place-based management and implementation through external partners
- Expanded collection and delivery of animal movement, habitat, and biodiversity data that inform ecosystem status and trend indicators as well as large-scale oceanographic indices, which assist scientists and resource managers with tracking and understanding climate-driven marine resource impacts
- Capacity for new marine life observing and data management approaches, including development and use of new technologies as well as cyberinfrastructure support, is expanded or initiated through external partnerships.
- New data syntheses, models, products and tools supporting place-based condition and ecosystem assessment reports, management and decision-making
- Sites for restoration, monitoring and protection identified and managed based on IOOS community-supported observing, modeling and analysis

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of Integrated Ecosystem Assessments/Ecosystem Status Reports are automatically updated with IOOS Marine Life observations					
With Increase	1	3	5	8	9
Without Increase	1	1	1	1	1
Outyear Costs:					
Direct Obligations	15,000	15,000	15,000	15,000	15,000
Capitalized	0	0	0	0	0
Uncapitalized	15,000	15,000	15,000	15,000	15,000
Budget Authority	15,000	15,000	15,000	15,000	15,000
Outlays	9,300	9,300	9,300	9,300	9,300
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Navigation, Observations and Positioning
Subactivity: IOOS Regional Observations

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	0	0	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	0	0	0	0	0
12	Civilian personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	0	0
22	Transportation of things	5	0	0	0	0
23	Rent, communications, and utilitites	5	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	575	303	303	415	112
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	46	0	0	0	0
31	Equipment	250	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	40,788	40,197	40,197	55,085	14,888
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
71	Overhead	29	0	0	0	0
99	Total obligations	41,698	40,500	40,500	55,500	15,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
IOOS Regional Observations	Pos./BA	0	40,500	0	50,500	0	10,000
	FTE/OBL	0	40,500	0	50,500	0	10,000

Advancing Coastal and Ocean Modeling and Prediction (+$10,000, 0 FTE/0 Positions) - NOAA requests additional funding for grants to enhance integrated coastal modeling applications to benefit marine navigation and protect human health. This investment will aid in planning and response to hazardous material spills, siting and developing of alternative energy, managing coastal and living marine resources, and planning for inundation risk in a changing world. NOAA will expand the availability and increase the accuracy of operational oceanographic services spanning the entire U.S. coastline to meet safety, economic, and stewardship needs based on model development and advancement of predictive capabilities generated by grant recipients. Throughout the execution of these grants, NOAA will foster a collaborative approach between internal scientists and external non-federal scientists to accelerate the transition of innovation into NOAA operations, developing a national backbone of ocean prediction systems and delivering decision support information to coastal stakeholders. Grant recipients would be the IOOS RAs, or members of the external scientific community that collaborates with them.

This request is dependent upon NOAA's ability to harden internal infrastructure and enhance operational capability, as seen in the Complete National Coastal Modeling Coverage (NOS-34) and Data Management and Cyberinfrastructure (NOS-44) requests. The products developed through these grants will enhance regional operational forecast systems and data products for living marine resource management needs under the NOAA Climate and Fisheries Initiative (scheduled to be published FY 2021).

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022 – FY 2026

- Advance collaborations with the extramural community to support the development of operational ocean predictions (FY 2022)

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- Establish Federal Notice of Funding Opportunities (NOFO) to integrate scientific and engineering advances into operational forecast systems (FY 2022)
- Compile a data set of in situ and satellite observations into a publicly accessible, cloud hosted, service allowing public access and big data approaches to analysis (FY 2022)
- Implement NOAA Unified Forecast System-compliant data assimilation algorithms into operational models (FY 2022)
- Prototype 30 year hindcasts and reanalysis of physical variables on the US West Coast (FY 2023)
- Modernize software engineering infrastructure that allows NOAA to partner with the extramural community to advance and improve operational models (FY 2023)
- Prototype US East coast and Gulf of Mexico nowcast and short-term forecast systems (FY 2024)
- Develop and disseminate final 30 year hindcasts and reanalysis of physical variables on the US West Coast (FY 2024)
- Develop national coverage of complementary nowcast/forecast systems on a regional scale that serves as a testbed for future enhancements in operational modeling (FY 2025 – FY 2026)
- Initiate planning and design to expand operational forecast capabilities to the Pacific Islands, Alaska, and Caribbean Regions to achieve complete coverage for the entire U.S. coastal zone (FY 2025 – FY 2026)

Deliverables:

- Fully operational regional prediction system spanning the continental U.S. that supports targeted research to understand climate change impacts on living marine resources, identifies risks and evaluates best management strategies for resilient resources and coastal communities.
- Long historical hindcasts and reanalyses of regional Operational Forecasts System conducted and made accessible to enable development of climate applications for Living Marine Resources management needs

Performance Measures	2022	2023	2024	2025	2026
Number of IOOS Regions with model enhancements to support living marine resource management (Maximum: 11 Regions)					
With Increase	4	5	6	7	8
Without Increase	4	4	4	4	4

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Outyear Costs:					
Direct Obligations	10,000	10,000	10,000	10,000	10,000
Capitalized	0	0	0	0	0
Uncapitalized	10,000	10,000	10,000	10,000	10,000
Budget Authority	10,000	10,000	10,000	10,000	10,000
Outlays	6,200	6,200	6,200	6,200	6,200
FTE	0	0	0	0	0
Positions	0	0	0	0	0

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PROGRAM CANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Navigation, Observations, and Positioning
Subactivity: IOOS Regional Observations

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	0	0	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	0	0	0	0	0
12	Civilian personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	0	0
22	Transportation of things	4	0	0	0	0
23	Rent, communications, and utilitites	5	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	537	303	303	378	75
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	43	0	0	0	0
31	Equipment	233	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	38,106	40,197	40,197	50,122	9,925
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
71	Overhead	27	0			
99	Total obligations	38,955	40,500	40,500	50,500	10,000

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		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
IOOS Regional Observations	Pos./BA	0	40,500	0	44,500	0	4,000
	FTE/OBL	0	40,500	0	44,500	0	4,000

Coastal Moorings with Ecological Monitoring (+$4,000, 0 FTE/0 Positions) – NOAA requests an increase in grant funding to improve NOAA's infrastructure to monitor, predict, and understand environmental conditions driving ecosystem variability and change through the IOOS-regional coastal moorings network.

Coastal moorings are vital and versatile ocean observing platforms. Whether it's a buoy or an instrument cluster suspended below the surface, the instruments and sensors deployed on these platforms gather a wide range of ocean information customized to network and user requirements. In 2016, a focused effort by NOAA and non-federal partners defined a framework for the planning and implementation of a sustained network of coastal moorings in U.S. waters, called the National Strategy for a Sustained Network of Coastal Moorings.[11] This Strategy justifies the need for a core sustained network of Federal and non-federal coastal moorings that adheres to national and international data standards and best practices.[12] Therefore, with this funding request, NOAA will expand the core network of Federal and non-federal moorings, integrated with other environmental observing systems, which will contribute to the improvement of resource management, safety of life, protection of property, enhancement of the economy, and scientific understanding of the coastal system.

NOAA's IOOS office will expand its existing network of multi-purpose moorings technology through its RAs network, and add new mission-required sensors for ecosystem management purposes. NOAA's grant partners will address a critical need to develop the baseline capability infrastructure for ecosystem monitoring required for climate-based living marine resource management, with added measurements (e.g. acidity, nitrates, acoustics, and genomics) necessary for targeted regional needs and applications. With these funds, NOAA will invest in a full suite of ecosystem sensors measuring physical oceanographic variables (e.g. water temperature, salinity, current speed/direction), biogeochemical variables (e.g. chlorophyll, dissolved oxygen, nitrates) and meteorological variables (e.g. wind

[11] National Strategy for a Sustained Network of Coastal Moorings (2017) https://cdn.ioos.noaa.gov/media/2017/12/NationalStrategyforSustainedNetworkofCoastalMoorings_FINAL.pdf
[12] National Strategy for a Sustained Network of Coastal Moorings (2017), p.10; https://cdn.ioos.noaa.gov/media/2017/12/NationalStrategyforSustainedNetworkofCoastalMoorings_FINAL.pdf

speed/direction, air temperature, air pressure), and equipment for new mooring platforms or repairs (e.g. buoy hulls) to ensure sustained operations across a wide geographic distribution. Resulting enhancements will build on NOAA's sustained network; these partnerships will improve NOAA's ability to detect and forecast climate trends, identify mechanisms that affect ecosystem health through 'omics information, and monitor and track harmful algal bloom and hypoxia events, ocean acidification, fish aggregation and spawning, sea level rise, and year-round ecosystem processes in the Great Lakes.

This suite of information is essential for understanding and mitigating the place-based trends and impacts of climate change on coastal economies that rely on living marine resources. These moorings and sensors are critical components to fill gaps in ocean observations to improve ocean and living marine resource forecasts under the NOAA Climate and Fisheries Initiative[13].

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022 – FY 2026

- Initialize the assessment of a sustainability and gap filling plan consistent with 2018 Ecosystem Moorings Workshop Report[14] (FY 2022)
- Issue funding to IOOS RAs' grants to begin refit and refurbishing and confirm most critical gaps to fill in each region in accordance with science and stakeholder needs. (FY 2022)
- Oversee the IOOS RAs to identify spatial gaps in ecosystem monitoring that can be filled by moorings, following the 2018 Ecosystem Moorings Workshop Report (FY 2023)
- Fund the IOOS RAs to increase the number of ecosystem moorings in accordance with deployment plans and stakeholder needs (FY 2023)
- Increase the number of ecosystem moorings with the configuration of core measurements described in the 2018 Ecosystem Moorings Workshop Report AND/OR enhance an existing ecosystem mooring with recommended additional sensors based on regional needs and applications as described in the Report (FY 2024 – 2026)
- Allot funding for operations and maintenance of existing ecosystem moorings to sustain operations for building climate records (FY 2024 – 2026)

[13] Scheduled for release before the end of FY 2021.
[14] https://www.act-us.info/Download/Workshops/2018/Ecosystem_Mooring_Workshop_Report.pdf

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Deliverables:

- A five year deployment plan identifying planned ecosystem moorings that includes new moorings and/or enhancements to existing moorings, and operations and maintenance plans to ensure continuous operations
- Completed operations and maintenance on all moorings that contribute to ecosystem monitoring
- At least one mooring per region containing the recommended suite of measurements for ecosystem monitoring and the core measurements required, depending on regional requirements
- A total of at least 40 moorings are capable of ecosystem monitoring, as recommended by the National Strategy for a Sustained Network of Coastal Moorings[15]
- At least one mooring per IOOS Region is a high-capability ecosystem mooring, depending on regional requirements, per the 2018 Ecosystem Moorings Workshop Report

Performance Measures	2022	2023	2024	2025	2026
Number of Ecosystem Moorings across the 11 RAs					
With Increase	8	19	30	35	40
Without Increase	8	8	8	8	8
Outyear Costs:					
Direct Obligations	4,000	4,000	4,000	4,000	4,000
Capitalized	0	0	0	0	0
Uncapitalized	4,000	4,000	4,000	4,000	4,000
Budget Authority	4,000	4,000	4,000	4,000	4,000
Outlays	2,480	2,480	2,480	2,480	2,480
FTE	0	0	0	0	0
Positions	0	0	0	0	0

[15] National Strategy for a Sustained Network of Coastal Moorings (2017); https://cdn.ioos.noaa.gov/media/2017/12/NationalStrategyforSustainedNetworkofCoastalMoorings_FINAL.pdf

Exhibit 15

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PROGRAM CANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Navigation, Observations, and Positioning
Subactivity: IOOS Regional Observations

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	0	0	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	0	0	0	0	0
12	Civilian personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	0	0
22	Transportation of things	5	0	0	0	0
23	Rent, communications, and utilitites	5	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	574	303	303	333	30
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	46	0	0	0	0
31	Equipment	250	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	40,789	40,197	40,197	44,167	3,970
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
71	Overhead	29	0			
99	Total obligations	41,698	40,500	40,500	44,500	4,000

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JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Coastal Science and Assessment

Goal Statement

Conduct applied research and deliver scientific information for disaster response and management, protection, and restoration of ocean and coastal resources. Provide coastal managers information and planning tools to guide communities in managing ocean space, anticipating and responding to climate change, and protecting fisheries and drinking water from harmful algal blooms (HABs) and other contaminants.

Base Program

The work conducted within the Coastal Science and Assessment activity helps with addressing and mitigating impacts of threats to coastal resources (e.g. from oil and chemical spills, marine debris, HABs, and climate change), and for developing tools for siting of wind energy and aquaculture development, green infrastructure, and habitat restoration to support the blue economy. Through this activity, NOS provides the Environmental Response Management Application (ERMA®), an online tool that integrates real-time data with mapping to coordinate emergency response to coastal disasters. NOS ecological forecasts enable communities and businesses to plan for and mitigate the impacts of HABs, hypoxia, pathogens, and other ecological threats. Ecological forecasts and vulnerability assessments provide an avenue to mitigate the impacts of climate change, build climate resilience, and provide science tools that inform environmental justice.

The following offices are responsible for carrying out the Coastal Science and Assessment program:

- **National Centers for Coastal Ocean Science (NCCOS)** – builds the science foundation and vulnerability assessments in support of community and ecosystem resilience to climate change, research, prevention, and forecasting for

  . Available at: https://coastalscience.noaa.gov/
- **Office of Response and Restoration (OR&R)** – center of expertise in preparing for, evaluating, and responding to threats to coastal environments including oil and chemical spills, releases from hazardous waste sites, marine debris, and natural disasters. When coastal and marine natural resources suffer damages, OR&R assesses the damage and ensures that response and recovery actions mitigate harm to those resources and surrounding economies. Available at: https://response.restoration.noaa.gov/

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JUSTIFICATION OF PROGRAM AND PERFORMANCE
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Statement of Operating Objectives

Schedule and Milestones:

- Provide HAB, pathogen, and hypoxia forecasts that protect communities (drinking water) and support the blue economy (recreation and seafood) in the Gulf of Maine, Chesapeake Bay, Gulf of Mexico, Lake Erie, and the Pacific Northwest (ongoing)
- Increase capacity for long-term coastal planning by improving tools and products for modeling impacts of sea-level rise and assessing vulnerabilities of marshes and beaches to sea level rise and coastal storms (ongoing)
- Protect communities from sea level rise and storm surge by using dredged sediment from nearby navigation channels to create wetlands
- Improve aquaculture siting and environmental monitoring tools to facilitate safe and efficient offshore aquaculture (ongoing)
- Validate and transition HAB detection and monitoring products to provide identification and toxicity measurements for regional observing networks, states, municipalities and tribal nations (ongoing)
- Resolve liability for five natural resource damage assessment cases annually (ongoing)
- Release updates to three publicly available emergency response tools annually (ongoing)
- Train 2,000 emergency responders annually
- Remove 600 metric tons of marine debris annually
- Execute the multi-year Incident Exercise Plan via an annual NOAA Concept of Operations level exercise focused on mission support

Deliverables:

- Partner with Acquisition and Grants Office to ensure timely modification of contracts (FY 2022)
- Continue implementing the laboratory facilities disposition and attrition/workforce restructuring plan (FY 2022)
- Aquaculture operators trained in early detection of algae that are harmful to shellfish, and guidelines for aquaculture monitoring that are consistent nationally, regionally appropriate and environmentally responsible (FY 2022)
- Technical guidance on monitoring coral restoration projects and methods to evaluate restoration success from local to ecosystem scales
- Improved estimates of the social and economic effects and costs of response to HABs in the U.S. (FY 2022 and ongoing)
- Operational forecasts for HABs in Lake Erie and the Gulf of Mexico, and for pathogens forecasts in the Chesapeake Bay, and Pacific Northwest (ongoing)

- Best practices using uncrewed aerial systems to detect change and monitor climate impacts to coastal wetlands (FY 2022)
- Increased use of science-based predictions of marsh vulnerability, stakeholder input, and dredge sediment availability to identity options for beneficial use of dredged material to protect shorelines and create habitat (FY 2022 and ongoing)
- Up to two research projects funded annually that address marine debris research priorities (ongoing)

Explanation and Justification

Comparison by subactivity		2020 Actuals Personnel	2020 Actuals Amount	2021 Enacted Personnel	2021 Enacted Amount	2022 Base Program Personnel	2022 Base Program Amount
Coastal Science, Assessment, Response and Restoration	Pos/BA	249	89,695	278	85,240	274	87,167
	FTE/OBL	239	94,123	263	85,240	259	87,167
Competitive Research	Pos/BA	0	18,981	3	21,000	3	22,000
	FTE/OBL	3	19,309	3	21,000	3	22,000
Total Coastal Science and Assessment	Pos/BA	249	108,676	281	106,240	277	109,167
	FTE/OBL	242	113,432	266	106,240	262	109,167

Coastal Science and Monitoring

NOAA's applied research, ecological assessment, and tool development builds the scientific foundation to plan for and manage environmental risks to coastal communities and economies. These activities inform coastal management through research on wind energy, natural-infrastructure, and aquaculture siting and sustainability; habitat mapping and biogeographic assessments; and ecological forecasts and vulnerability assessments. Ecological forecasts for hazards such as HABs and pathogens help communities safeguard drinking water and commercial and recreational fisheries, and forecasting climate impacts help us plan for resilient infrastructure and protected areas. Research on contaminants (including oil, hazardous chemicals, and microplastics) improves disaster response and restoration. Vulnerability assessments and shoreline stabilization tools help communities prepare for inundation and storms.

NOAA intramural research programs have longstanding expertise in key areas that assist critical partners in the emergency and resource management communities. For example, when natural resource damage occurs, NOAA's long-term monitoring datasets establish a baseline of ecosystem conditions that existed before the event for assessing the extent of damages. The research in

these areas also enables NOAA to develop resource protection strategies for National Marine Sanctuaries and other NOAA-managed areas.

The NOAA Coastal Science and Monitoring Program has four focus areas:

- **Marine Ecology.** NOAA provides information that communities, state and Federal stewards, and industries (such as aquaculture, energy and tourism) use to make decisions balancing the trade-offs between resource use and conservation.
- **Stressor Impacts and Mitigation.** NOAA's research in ecological forecasting, stressor detection, and understanding of stressor impacts on coastal resources help communities protect their water supplies, local fishing and shellfishing industries, public health, and coastal and lakefront tourism.
- **Coastal Change.** NOAA research efforts seek to understand the ecosystem services that improve a community's adaptation to changing conditions. This knowledge will help coastal communities take action and address the persistent threats from coastal storms, flooding, and rising seas.
- **Social Science**. All coastal and marine management decisions affect multiple communities. NOAA's coastal science and monitoring social science portfolio studies connections between people and the environment.

The NCCOS Competitive Research Program funds regional-scale and targeted research and assessment activities through a competitive external grant process in support of NOAA's coastal mission areas. This program maintains the only national grant programs dedicated to research topics under the HAB and Hypoxia Research and Control Act (HABHRCA). Grantee developed detection tools and forecast models for HABs have helped to protect public health and prevent adverse economic impacts from contaminated, unsafe drinking water supplies, and beachgoers' exposure to algal toxins. The grants also address a variety of other issues, such as hypoxia, coastal resiliency, effective ecosystem-based management, coastal flooding, and climate change impacts such as sea-level rise and ocean acidification.

Coordination among NOAA, grantee researchers, and user communities ensures that research findings and new technologies developed through this program are applied to resource management decisions. For example, grantee research protects traditional and subsistence use of natural resources and the health of Tribes and Alaska Native communities by communicating HAB risks and expanding the capacity for Tribes to detect HAB toxins in shellfish. The Gulf of Mexico states use grantee research to assess coastal vulnerability to sea level rise and coastal storms, target land acquisition and habitat restoration projects, and to plan for building adaptation and infrastructure protection.

The funding currently supports a diverse portfolio of six programs with 82 awards to over 160 institutions and 370 principal investigators in 27 states and territories. Topics include:

- Predicting HAB and developing tools to prevent, detect, control, and mitigate HABs and their impacts;
- Determining the causes and biological impacts of hypoxia (low oxygen) in coastal waters
- Managing coastal ecosystems to mitigate impacts from inundation and coastal storms, assessing the economic value of protecting the communities and infrastructure fusing natural habitats and nature based approaches
- Understanding species' habitat usage and connectivity to increase the resilience of managed areas to climate and other impacts
- Developing partnerships across NOAA to assess the combined effects of ocean acidification, HABs, and hypoxia on economically and ecologically significant species and habitats

NCCOS extramural research grants are responsible for much of the regional-scale, integrated science that informs Marine Protected Area (MPA) management, coastal flooding and sea-level rise vulnerability and adaptation, and serves as the foundation for innovative HAB control and mitigation techniques.

Emergency Response, Assessment and Restoration of NOAA Trust Resources
Federal, state, and local agencies across the country depend on NOAA's scientific advice and training of responders to minimize harm to natural resources from anthropogenic and natural hazards. These hazards can include oil and chemical spills, vessel groundings, hazardous waste releases, hurricanes, and national security events. NOAA also addresses persistent coastal hazards such as marine debris. NOAA's emergency services include spill trajectory modeling, shoreline cleanup assessment, impacts identification, incident coordination, and information management. NOAA also partners with EPA to support first responders with critical on the ground decision support tools across the country and the world. In December 2020, the Great Lakes Environmental Sensitivity Index (ESI) Act of 2020 was signed into law requiring NOAA to begin updating ESI products for the Great Lakes within 180 days.

Disaster Preparedness
In 2017, NOS consolidated its interagency and intergovernmental responder training, preparedness and incident coordination under the Disaster Preparedness Program (DPP). The DPP includes, and will continue to build on, the vision and activities at the Gulf of Mexico Disaster Response Center (DRC), to improve national preparedness for and response to all hazard types. During hurricane seasons, the DPP and the DRC coordinate across all NOS program offices to gather information on NOS mission support, logistical

needs, and impacts to NOS personnel and infrastructure. The DPP is also charged with ensuring effective continuity of operations in NOS, and as such is the central coordination body for NOS mission readiness and situational awareness during COVID-19, routinely tracking impacts to NOS's personnel, mission, and infrastructure during the pandemic.

After the initial response to an acute or chronic pollution event or grounding, NOAA and other natural resource trustees are responsible for determining the extent of damages to natural resources and for seeking compensation on behalf of the public for the loss of ecosystem services, including restoration. NOS' OR&R works with NOAA's General Counsel for Natural Resources and the NMFS Office of Habitat Conservation to carry out the NOAA Damage Assessment, Remediation and Restoration Program (DARRP). NOS's role in the DARRP is to assess environmental and economic injury to public natural resources from pollution events and ship groundings. NOS also ensures that cleanup actions protect resources from further damage and promote faster recovery.

Through the DARRP, NOAA and co-trustees have secured almost $10.5 billion for restoration from responsible parties at over 300 oil spills, Superfund sites and ship groundings, since 1998. Through March 2021, settlements by NOAA and co-trustees collected $45.33 million. These funds are reserved for ecosystem restoration and restoration of recreational use of the damaged resources. Funds are not applied to third party or private claims for property damage and lost business. In addition to securing resources for restoration, NOAA has also ensured that protection and restoration have been integrated into 500+ waste site cleanups to reduce further injuries and promote recovery. These restoration projects provide economic benefits in the form of tourism, recreation (fishing, etc.), green jobs, coastal resiliency, property values and quality of life, including in disadvantaged communities. There are currently 111 active cases in the DARRP docket; as of March 2021, 44 cases were in active injury assessment and restoration planning. Each case represents an oil spill, chemical spill, hazardous waste site, or ship grounding that may have damaged natural resources or reduced recreational opportunities.

Marine Debris

NOS, through the Marine Debris Program, is the Federal lead for addressing marine debris affecting the ocean and coastal environment and navigation safety in the U.S. Marine debris is an added stressor to the natural environment that impairs ecosystem services and thereby coastal and ocean resilience. The program's scope includes marine debris prevention, removal, research, response, coordination, and monitoring and detection. The program provides grants to partners across the country to prevent, remove, and research marine debris. The Marine Debris Program works collaboratively with partners to prepare and respond to marine debris generated by natural disasters, such as hurricanes, floods, and tsunamis. For example, to support communities impacted by Hurricanes Florence and Michael and Typhoon Yutu, NOAA distributed over $8 million in disaster relief funding through the National Fish and Wildlife Foundation to support marine debris assessment, removal, and disposal in the impacted areas of North Carolina, Florida, and the Northern Mariana Islands. NOAA chairs the Interagency Marine Debris Coordinating Committee which

helps inform and coordinate action across the U.S. Government to more effectively address this issue. NOAA demonstrates international leadership in several key global efforts (e.g., Global Partnership on Marine Litter, Global Ghost Gear Initiative) that coordinate action across governments, private industry, civil society and other stakeholders to holistically address marine debris.

In December 2020, the Save our Seas 2.0 Act was signed into law. The new law amends the Marine Debris Act (33 U.S.C. 1951 et seq.) and provides additional mandates and authorities for NOAA to enhance the domestic marine debris response. A key element in the Act is the establishment of a Marine Debris Foundation to augment NOAA's work to assess, prevent, reduce, and remove marine debris. Other significant components of the Act include establishing a Genius Prize for Save Our Seas Innovation and requiring NOAA and the Interagency Marine Debris Coordinating Committee to deliver multiple reports to Congress.

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		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Coastal Science, Assessment, Response and Restoration	Pos./BA	274	87,167	283	99,167	9	12,000
	FTE/OBL	259	87,167	266	99,167	7	12,000

Prepare Coastal Communities for Disasters (+$12,000, 7 FTE/9 Positions) – NOAA requests additional funding to improve its disaster readiness and response posture for climate-related and other coastal disasters as they become more frequent and intense. As the frequency and intensity of hurricanes and other weather-related events increase as a result of climate change, NOS' DPP and scientific support coordinators are being increasingly called upon to provide key support for coastal disasters. NOAA will invest this funding in the following ways:

- $7,000 to build continuity and response capacity. This effort will expand the multi-year exercise program, which engages emergency managers in realistic simulations of emergencies. By enhancing the emergency preparedness training program to reach more Federal staff and State and Local responders, NOAA will greatly strengthen our National capacity to respond to emergency events in these changing times. Key improvements to knowledge and understanding will be made by expanding existing science and development support, and addressing internal and external preparedness gaps, including investing in safer and more efficient response equipment.

- $5,000 to initiate a nationwide refresh of its ESI maps and data in order to provide a concise summary of coastal resources at risk. This refresh will ensure preparedness and response professionals have more accurate baseline data, helping reduce potential environmental consequences by identifying vulnerable locations, establishing protection priorities, and determining cleanup strategies. Without accurate ESI maps, responders will not have updated shoreline, species, habitat, and socioeconomic information that is critically needed for timely decision making during a disaster. These data are changing rapidly as a result of increasing development, storms, coastal inundation, or environmental pressures. One of the many strengths of ESIs is the indexing and distillation of extensive data to ensure that disaster planners and responders have ready access to needed information to protect

environmental and economic resources. Without needed updates, time critical response resources may be misallocated due to use of outdated information.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022 – FY 2026

- Expand OR&R's scientific support expertise and emergency response role to support all hazards support to coastal communities
- Plan and execute additional virtual, online, and in-person trainings for NOAA staff and partners in the response community
- Expand the DPP Lagniappe Awards program to help partners within NOS address critical preparedness and response gaps
- Fund the production of ESI maps for coastal areas of the U.S.

Deliverables:

- Enhanced response capacity through additional training and exercises
- Completed research and analysis to aid in the expansion of ESI sensitivity indices that will address all hazards
- Public release of updated ESI data

Performance Measures	2022	2023	2024	2025	2026
Number of responders trained in technical and scientific elements and tools of incident response					
With Increase	2,500	3,000	3,000	4,000	4,000
Without Increase	2,000	2,000	2,000	2,000	2,000
Nationwide refresh of ESI data and maps					
With Increase	7%	19%	31%	43%	55%
Without Increase	0%	0%	0%	0%	0%

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Outyear Costs:					
Direct Obligations	12,000	12,000	12,000	12,000	12,000
Capitalized	0	0	0	0	0
Uncapitalized	12,000	12,000	12,000	12,000	12,000
Budget Authority	12,000	12,000	12,000	12,000	12,000
Outlays	7,440	7,440	7,440	7,440	7,440
FTE	7	9	9	9	9
Positions	9	9	9	9	9

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Coastal Science and Assessment
Subactivity: Coastal Science, Assessment, Response and Restoration
Program Change: Prepare Coastal Communities for Disasters

Title		Grade	Number	Salary	Salaries
Regional Prepardness Coordinator		ZP-04	2	160,000	320,000
Chemist		ZP-3/4	1	150,000	150,000
Biologist		ZP-3/4	1	150,000	150,000
Oceanographer/Physical Scientist		ZP-3/4	1	150,000	150,000
Development Program Manager		ZP-04	1	160,000	160,000
Field Branch Supervisor		ZP-05	1	172,000	172,000
Disaster Prepardness Program Deputy		ZP-05	1	172,000	172,000
Program/Policy Analyst		ZA-04	1	159,000	159,000
Total			9		1,433,000
Less lapse	25.00%		(2)		(358,250)
Total full-time permanent (FTE)			7		1,074,750
2022 Pay Adjustment (2.7%)					29,018
					1,103,768

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	7
Total FTE	7
Authorized Positions:	
Full-time permanent	9
Total Positions	9

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Coastal Science and Assessment
Subactivity: Coastal Science, Assessment, Response and Restoration

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	34,959	28,877	30,685	31,789	1,104
11.3	Other than full-time permanent	596	375	375	375	0
11.5	Other personnel compensation	709	775	775	775	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	36,264	30,027	31,835	32,939	1,104
12	Civilian personnel benefits	12,330	9,621	10,730	11,150	420
13	Benefits for former personnel	12	95	95	95	0
21	Travel and transportation of persons	715	608	608	708	100
22	Transportation of things	152	155	155	155	0
23	Rent, communications, and utilitites	3,392	2,955	2,954	2,954	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	32	106	106	106	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	26,542	33,800	33,797	42,573	8,776
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,594	1,454	1,454	1,454	0
31	Equipment	995	683	683	1,283	600
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	6,481	5,736	4,750	5,750	1,000
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	0	0	0	0
44	Refunds	0	0	0	0	0
77	Overhead	5,613	0	0	0	0
99	Total obligations	94,123	85,240	87,167	99,167	12,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Coastal Science, Assessment, Response and Restoration	Pos./BA	274	87,167	278	96,167	4	9,000
	FTE/OBL	259	87,167	262	96,167	3	9,000

Enhancing Community Based Marine Debris Prevention, Removal, and Research (+$9,000, 3 FTE/4 Positions) – NOAA requests additional funding for marine debris prevention, removal, and research activities by increasing nationwide competitive funding opportunities. This funding will focus on the prevention of land-based litter, support projects that prevent the introduction of marine debris into the marine and coastal environment, and raise awareness through outreach and education. In addition, funding will remove derelict fishing gear and other medium- to large scale debris; support projects that improve understanding of the scope, scale, and distribution of marine debris in the environment, and expand the frontiers of marine debris science, and reduce marine debris in important habitat, recreation, and tourism areas. NOAA will continue to partner with the National Fish and Wildlife Foundation through the Fishing for Energy program to provide commercial fishermen with no-cost solutions to dispose of derelict and retired fishing gear, and will partner to provide funding support to commercial fishers to aid in economic recovery and improve ocean and coastal resilience by removing, disposing, and preventing derelict fishing gear and plastic found at sea. The staff associated with this request will ensure the timely processing, expertise, and technical oversight required for a granting program of this size.

The Save our Seas 2.0 Act provides additional mandates and authorities for NOAA to enhance the domestic marine debris response, including through the establishment of a Marine Debris Foundation to augment NOAA's work to assess, prevent, reduce, and remove marine debris; and establishing a Genius Prize for Save Our Seas Innovation. These funds will enable NOAA to support the Foundation and the Genius Prize as envisioned by Congress.

There is an increasing need for NOAA to create and foster natural and economic resilience along our coasts through support, expertise and robust, on-the-ground partnerships and place-based conservation activities. Ecological restoration and community resilience, as outlined in EO 14008, are integral to NOAA and the Administration's climate strategy.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022 – FY 2026

- Complete a cooperative agreement with the Marine Debris Foundation established in Save Our Seas 2.0 Act (FY 2022)
- Award additional projects to remove marine debris and reduce the negative impact on NOAA trust resources and important habitat areas and aid in economy recovery (FY 2022 - FY 2026)
- Increase the number of youth and adults participating in formal and informal marine debris education and outreach opportunities (FY 2022 – FY 2026)
- Fund additional research and monitoring projects that expand the frontiers of marine debris science in the focal areas of source, fate, and transport, from upstream to the coastal zone (FY 2023 – FY 2026)

Deliverables:

- Remove an additional 400 metric tons of marine debris annually, for a total of 1,000 metric tons on an annual basis through grant recipients by FY 2024
- Reach an additional 10,500 people through NOAA-supported marine debris education and outreach programming annually, in collaboration with grant recipients, for a total of 27,000 people by FY 2024
- At least six research projects funded biennially that address priority research questions

Performance Measures	2022	2023	2024	2025	2026
Metric tons of marine debris removed annually					
With Increase	600	800	1,000	1,000	1,000
Without Increase	600	600	600	600	600
Number of people (youth and adults) that participate in NOAA-supported marine debris education and outreach programming					
With Increase	16,500	21,900	27,000	27,000	27,000
Without Increase	16,500	16,500	16,500	16,500	16,500

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Outyear Costs:					
Direct Obligations	9,000	9,000	9,000	9,000	9,000
Capitalized	0	0	0	0	0
Uncapitalized	9,000	9,000	9,000	9,000	9,000
Budget Authority	9,000	9,000	9,000	9,000	9,000
Outlays	5,580	5,580	5,580	5,580	5,580
FTE	3	4	4	4	4
Positions	4	4	4	4	4

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Coastal Science and Assessment
Subactivity: Coastal Science, Assessment, Response and Restoration
Program Change: Enhancing Community Based Marine Debris Prevention, Removal, and Research

Title		Grade	Number	Annual Salary	Total Salaries
Management and Program Analyst		ZA 3/4	2	150,000	300,000
Environmental Scientist		ZP-3/4	1	150,000	150,000
Physical Scientist		ZP-3/4	1	150,000	150,000
Total			4		600,000
Less lapse	25.00%		(1)		(150,000)
Total full-time permanent (FTE)			3		450,000
2022 Pay Adjustment (2.7%)					12,150
					462,150

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	3
Total FTE	3
Authorized Positions:	
Full-time permanent	4
Total Positions	4

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Coastal Science and Assessment
Subactivity: Coastal Science, Assessment, Response and Restoration

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	34,959	28,877	30,685	31,147	462
11.3	Other than full-time permanent	596	375	375	375	0
11.5	Other personnel compensation	709	775	775	775	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	36,264	30,027	31,835	32,297	462
12	Civilian personnel benefits	12,330	9,621	10,730	10,906	176
13	Benefits for former personnel	12	95	95	95	0
21	Travel and transportation of persons	715	608	608	648	40
22	Transportation of things	151	155	155	155	0
23	Rent, communications, and utilitites	3,392	2,955	2,954	2,954	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	32	106	106	106	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	26,543	33,800	33,797	34,927	1,130
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,594	1,454	1,454	1,454	0
31	Equipment	995	683	683	7,875	7,192
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	6,481	5,736	4,750	4,750	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	0	0	0	0
44	Refunds	0	0	0	0	0
77	Overhead	5,613	0	0	0	0
99	Total obligations	94,123	85,240	87,167	96,167	9,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Coastal Science, Assessment, Response and Restoration	Pos./BA	274	87,167	278	89,167	4	2,000
	FTE/OBL	259	87,167	262	89,167	3	2,000

Fostering Ecological Resilience Through Conservation Action ($2,000, 3 FTE/4 Positions) – This is one of three complimentary requests across NOS programs required to convert the increasing number of observations into implementable conservation actions, and ensure that coastal communities receive the full suite of scientific support from NOAA programs and interagency partners to inform local management decisions. The complementary requests detailing data observing systems and subsequent usage of the converted observations in MPA management can be found in the Navigation, Observations and Positioning (NOS-39) and Sanctuaries and Marine Protected Areas (NOS-145) sections.

Here, NOAA is requesting additional funds to allow NCCOS to co-develop data products to:

- Characterize and monitor marine ecosystems and living marine resources Understand and predict impacts from climate change, other natural processes, and human activities
- Prioritize and synthesize long-term data collections; advance technologies for biological observing (e.g. 'omics, sound, optical and autonomous methods, Artificial Intelligence/Machine Learning)
- Develop targeted modelling, web-enized ecosystem trends, and other tools to inform adaptation strategies

Together, these three increases will ensure that the NCCOS, IOOS, and the Office of National Marine Sanctuaries can work collaboratively so that the increase in the number of observations, such as those collected through the resilience grants in the Monitoring Ecological Change Through Observing Systems request (NOS-53) are met with a robust integrated process to successfully convert these into implementable conservation actions, and inform key living marine resource and MPA management challenges, including as a critical component of NOAA's Climate Fisheries Initiative.

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Operations, Research, and Facilities
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(Dollar amounts in thousands)

There is an increasing need for NOAA to create and foster natural and economic resilience along our coasts through support, expertise and robust, on-the-ground partnerships and place-based conservation activities. Ecological restoration and community resilience, as outlined in EO 14008, are integral to NOAA and the Administration's climate strategy.

Schedule and Milestones:
FY 2022 – FY 2026

- Assess the ecological, cultural, and socio-economic vulnerability to sea level rise, flooding, and other climate-related threats and provide data and tools to implement adaptation strategies in two to five underserved coastal communities (FY 2022 – FY 2026)
- Use artificial intelligence and machine learning techniques and remote sensing field observations to expand our capacity to map, synthesize, and analyze bio-physical observations in the context of climate change (FY 2022 – FY 2026)
- Synthesize long-term data to define ecosystem trends, support ecological forecast models and visualization tools to inform adaptation strategies to build resilient communities and ecosystems (FY 2022 – FY 2026)

Deliverables:

- Deliver ecological, cultural, and socio-economic vulnerability assessments and digital dashboards that enable communities to plan, forecast, and respond to stressors linked to climate change (e.g., coastal inundation).
- Significantly increase bio-physical observations and digital map and assessment products through advancement of remote sensing tools (e.g., optical and acoustic sensors) and image analysis using Artificial Intelligence/Machine Learning techniques, and state-of-the art photogrammetry
- Deliver Integrated Ecosystem Assessments and digital tools that address coupled natural and socio-economic management issues (siting of coastal infrastructure, climate impacts) through models that explore alternative management scenarios to increase coastal resiliency

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Total number of MPA/Sanctuary/Monument sites where biodiversity and habitat condition and assessments are automatically updated with IOOS Marine Life observations					
With Increase - total if all three requests are funded	3	6	9	12	14
With Increase - if only this request is funded	3	4	5	6	7
Without Increase	3	3	3	3	3
Number of vulnerability assessments (social, ecological, economic) completed per year in underserved coastal communities					
With Increase	0	1	2	1	2
Without Increase	0	0	0	0	0
Percent increase in the rate (time / GB) of the collection, processing, and analysis of bio-physical observations through advancement of remote sensing tools and Artificial Intelligence/ Machine Learning					
With Increase	5	5	10	10	10
Without Increase	0	0	5	5	0
Outyear Costs:					
Direct Obligations	2,000	2,000	2,000	2,000	2,000
Capitalized	0	0	0	0	0
Uncapitalized	2,000	2,000	2,000	2,000	2,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Budget Authority	2,000	2,000	2,000	2,000	2,000
Outlays	1,240	1,240	1,240	1,240	1,240
FTE	3	4	4	4	4
Positions	4	4	4	4	4

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Coastal Science and Assessment
Subactivity: Coastal Science, Assessment, Response and Restoration
Program Change: Fostering Ecological Resilience Through Conservation Action

Title		Grade	Number	Annual Salary	Total Salaries
Environmental Scientist		ZP-04	4	159,000	636,000
Total			4		636,000
Less lapse	25.00%		(1)		(159,000)
Total full-time permanent (FTE)			3		477,000
2022 Pay Adjustment (2.7%)					12,879
					489,879

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	3
Total FTE	3
Authorized Positions:	
Full-time permanent	4
Total Positions	4

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Coastal Science and Assessment
Subactivity: Coastal Science, Assessment, Response and Restoration

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	34,959	28,877	30,685	31,175	490
11.3	Other than full-time permanent	596	375	375	375	0
11.5	Other personnel compensation	709	775	775	775	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	36,264	30,027	31,835	32,325	490
12	Civilian personnel benefits	12,330	9,621	10,730	10,916	186
13	Benefits for former personnel	12	95	95	95	0
21	Travel and transportation of persons	715	608	608	636	28
22	Transportation of things	151	155	155	155	0
23	Rent, communications, and utilitites	3,392	2,955	2,954	2,954	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	32	106	106	106	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	26,543	33,800	33,797	34,797	1,000
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,594	1,454	1,454	1,454	0
31	Equipment	995	683	683	979	296
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	6,481	5,736	4,750	4,750	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	0	0	0	0
44	Refunds	0	0	0	0	0
77	Overhead	5,613	0	0	0	0
99	Total obligations	94,123	85,240	87,167	89,167	2,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Coastal Science, Assessment, Response and Restoration	Pos./BA	274	87,167	274	88,067	0	900
	FTE/OBL	259	87,167	259	88,067	0	900

Enterprise Infrastructure Solutions (EIS) (+$900, 0 FTE/0 Positions) – This increase will enable NOAA to conduct a technology modernization and support an accelerated transition of telecommunications services to the GSA EIS contract vehicle. DOC currently uses GSA's Networx, Washington Interagency Telecommunications System 3, and regional contracts to acquire telecommunication services. These contracts expire in May 2023. Between now and then, DOC will be transitioning telecommunications services to the GSA EIS follow-on contract. Additional EIS requests can also be found in Mission Support (MS-65), NOS (NOS-48, NOS-120, NOS-149), NMFS (NMFS-71), NWS (NWS-24, NWS-127, NWS-182), NESDIS (NESDIS-37), and OMAO (OMAO-19).

The modernization enables NOAA to re-architect its network infrastructure to gain efficiencies and resilience, realize significantly reduced costs for network services after transition, and minimize risk as legacy services are discontinued. Increased funding will accelerate the transition and enable NOAA to: (a) contract for engineering services to re-architect the network infrastructure and establish detailed transition plans; (b) issue awards for new hardware and telecommunication services; (c) trench and lay new lines, decommission and provision circuits; and (d) establish funding for administrative services to provide ordering, invoice processing, and inventory management. By expediting the technology modernization and migration to the new EIS vendors, NOAA will realize significant reductions in price and cost-avoidance. This funding will reduce risks related to service delivery and operations due to termination of GSA legacy service contracts.
Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022 - 2026

- Award NOAA task orders under EIS to support modernization needs
- Establish a sustainable, resilient architecture to meet NOAA's current and planned needs

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

- Transition 100% NOAA Legacy GSA inventory to EIS

Deliverables:

- Modernized telecommunications infrastructure capable of meeting the agency's mission
- Provide a centralized ordering and management platform
- Provide a secure infrastructure resistant to extreme weather impacts

Performance Measures	2022	2023	2024	2025	2026
Transition of NOAA Telecommunication services to GSA's EIS*					
With Increase	35%	60%	80%	100%	0%
Without Increase	20%	45%	55%	65%	75%
*Assumes full funding of EIS initiatives NOAA-wide					
Outyear Costs:					
Direct Obligations	200	200	200	200	200
Capitalized	0	0	0	0	0
Uncapitalized	200	200	200	200	200
Budget Authority	200	200	200	200	200
Outlays	200	200	200	200	200
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Coastal Science and Assessment
Subactivity: Coastal Science, Assessment, Response and Restoration

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	34,959	28,877	30,685	30,685	0
11.3	Other than full-time permanent	596	375	375	375	0
11.5	Other personnel compensation	709	775	775	775	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	36,264	30,027	31,835	31,835	0
12	Civilian personnel benefits	12,330	9,621	10,730	10,730	0
13	Benefits for former personnel	12	95	95	95	0
21	Travel and transportation of persons	715	608	608	608	0
22	Transportation of things	151	155	155	155	0
23	Rent, communications, and utilitites	3,392	2,955	2,954	2,954	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	750	750
24	Printing and reproduction	32	106	106	106	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	26,543	33,800	33,797	33,947	150
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,594	1,454	1,454	1,454	0
31	Equipment	995	683	683	683	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	6,481	5,736	4,750	4,750	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	0	0	0	0
44	Refunds	0	0	0	0	0
77	Overhead	5,613	0	0	0	0
99	Total obligations	94,123	85,240	87,167	88,067	900

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Competitive	Pos./BA	3	22,000	11	42,000	8	20,000
Research	FTE/OBL	3	22,000	9	42,000	6	20,000

Nature-based Solutions to Enhance the Resilience of Coastal Ecosystems (+$20,000, 6 FTE/8 Positions) – NOAA requests additional funds to provide critical information and predictive capabilities to inform community adaptation planning to coastal inundation under sea level rise. Efforts will also enable the expanded use of nature-based solutions through a stressor-based approach. The Competitive Research Program will direct funds in the following ways:

- Expand competitive research through its extramural grant program Effects of Sea Level Rise (ESLR) which delivers tools to help communities mitigate and adapt to sea level rise, flooding, and inundation threats
- Support additional communities through the expansion of an ongoing partnership with the Department of Transportation focused on coastal infrastructure; provide an increased number of communities science capacity to evaluate vulnerability and assess the effectiveness of mitigation solutions; evaluate the social and economic value of nature-based solutions to shoreline protection to support climate planning; and inform infrastructure adaptation in underserved communities that are often overlooked in large regional research projects (e.g. arctic Alaska and Puerto Rico)
- Initiate new projects explicitly focused on conducting work with under-served communities, with an emphasis on enhanced environmental justice and increased local science capacity and training. This effort will increase the ability of underserved communities to apply for and gain access to grant funding opportunities. In doing so, NOAA will enhance existing, and develop additional interagency partnerships to provide holistic science and tools to mitigate risk of inundation to ecosystems, infrastructure, and communities
- Increase Competitive Research Program capacity to ensure grant management needs are met and provide appropriate technical oversight needed to facilitate grant recipient work

Research is a core capability of NOAA. This request will help NOAA meet the Administration's climate research goals, including EO 14008, and is critical to ensuring NOAA produces research data, tools, and information products that are publically accessible to facilitate climate change decision-making Nation-wide.

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Schedule and Milestones:

- Execute a Federal Funding Opportunity for up to five projects that enable the expanded use of nature-based solutions to mitigate coastal inundation under sea level rise and deliver guidance to support adaptation planning to underserved communities (FY 2022)
- Support at least 19 highly ranked existing coastal resilience grant applications and provide other programmatic assistance to at least 11 states to inform community adaptation planning to coastal inundation including highly underserved communities in Kotzebue (AK) and Puerto Rico (FY 2022 – FY 2026)
- Support at least eight highly ranked surface transportation resilience grant applications and provide other programmatic assistance to projects impacting at least six states to inform surface infrastructure adaptation planning; enhance a current partnership with the Department of Transportation, building upon ongoing efforts to fund research to facilitate adaptation of coastal infrastructure, including in highly underserved communities in arctic Alaska (FY 2022 – FY 2026)
- Execute annual funding opportunities and partnerships to initiate a minimum of six new projects each year to inform the community and regional adaptation and mitigation scenarios using nature-based solutions in 34 states and territories, including Great Lakes States (FY 2023 – FY 2026)
- Develop engagement tools including story maps and data visualization[16] for ESLR awards to ensure effective engagement with decision makers in communities (FY 2022 - FY 2026)
- Partner with the Department of Transportations, Federal Highway Administration Sustainable Pavements Team, to apply project findings into 2025 Asset Deterioration Plans (FY 2023 – FY 2025)
- Initiate the first ever effort to deliver national predictions of future marsh proximity and health that consider the biological and physical conditions that drive marsh health and its ability to keep up with rising seas (FY 2023 – FY 2026)
- Work with end users in all states and regions to evaluate new tools with stakeholders and help transfer existing tools across geographies that improve regional stakeholders' ability to use and apply data to inform management decisions (FY 2023 - 2026)

Deliverables:

- Research grants supporting at least 34 coastal states or territories, delivering clear guidance on managing natural resources and incorporating more natural habitat considerations into advanced flood protection strategies
- Local tailored information and tools to update city planning, infrastructure plans, and/or natural resource management planning for at least four underserved coastal communities at risk from inundation impacts now or under sea level rise

[16] Data visualization can be found at (http://www.gomsurge.com/)

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- Interactive tools and applications to predict and mitigate sea level rise and inundation that are developed with and used by end-users in the region of the project, guiding decision making
- Robust scientific guidance provided to state Department of Transportation programs on vulnerability to and mitigation of coastal flooding to surface transportation, and the cost effectiveness of those mitigation strategies[17]
- Improved management of coastal marshes through the development of a national approach for predicting marsh health and proximity around the nation under sea level rise scenarios using an ensemble of models that consider a broad range of approaches, from highly dynamic to elevation based models (via collaborations between NOAA and grant recipients)
- Increased capacity for evaluating nature based solutions in the Delaware Estuary region using advanced model predictions

Performance Measures	2022	2023	2024	2025	2026
Number of projects across all focus areas for the ESLR Program					
With Increase	31	33	33	39	36
Without Increase	10	8	8	7	7
Number of states supported by the ESLR Program[18]					
With Increase	21	23	25	28	34
Without Increase	11	9	9	9	9
Outyear Costs:					
Direct Obligations	20,000	20,000	20,000	20,000	20,000
Capitalized	0	0	0	0	0
Uncapitalized	20,000	20,000	20,000	20,000	20,000

[17] This would be conducted via extramural grants. Examples of related vulnerabilities include loss of subgrade from wave attack, weir flow damage, delamination, failure of subgrade due to prolonged inundation.
[18] Note that multiple projects have the same state representation and are only counted once, though topics may vary (this performance measure represents all focus areas.)

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Budget Authority	20,000	20,000	20,000	20,000	20,000
Outlays	12,400	12,400	12,400	12,400	12,400
FTE	6	8	8	8	8
Positions	8	8	8	8	8

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PROGRAM CHANGE PERSONNEL DETAIL

Activity: Coastal Science and Assessment
Subactivity: Competitive Research
Program Change: Nature-based Solutions to Enhance the Resilience of Coastal Ecosystems

Title		Grade	Number	Salary	Salaries
Environmental Scientist		ZP-04	3	159,000	477,000
Environmental Scientist		ZP-03	2	113,000	226,000
Program Analyst		ZA-04	1	159,000	159,000
Program Analyst		ZA-03	2	113,000	226,000
Total			8		1,088,000
Less lapse	25.00%		(2)		(272,000)
Total full-time permanent (FTE)			6		816,000
2022 Pay Adjustment (2.7%)					22,032
					838,032

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	6
Total FTE	6
Authorized Positions:	
Full-time permanent	8
Total Positions	8

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PROGRAM CANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Coastal Science and Assessment
Subactivity: Competitive Research

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	1	0	0	838	838
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	2	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	3	0	0	838	838
12	Civilian personnel benefits	0	0	0	318	318
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	10	70	70	70	0
22	Transportation of things	3	4	4	4	0
23	Rent, communications, and utilitites	0	10	10	10	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	0	7	7	7	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	1,209	2,705	2,705	2,705	0
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	107	343	343	343	0
31	Equipment	212	21	21	21	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	16,498	17,840	18,840	17,840	18,844
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
71	Overhead	1,267	0	0	0	0
99	Total obligations	19,309	21,000	22,000	22,156	20,000

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JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Ocean and Coastal Management and Services

Goal Statement

Use place-based, community, and regional approaches to effectively manage coastal and marine resources. Together, these activities and programs manage our special resources, and empower coastal states and communities with actionable information and resources needed to understand risk and increase resilience of coastal ecosystems and communities. These approaches emphasize collaboration and partnerships across multiple levels of governments and sectors.

Base Program

NOS manages national marine sanctuaries and other Marine Protected Areas (MPAs) that conserve and facilitate sustainable use of special places along our coasts and in our oceans and Great Lakes. NOS also equips coastal planners with the scientific tools and skills to better manage the Nation's coastal resources and communities. This includes the interactive Digital Coast web platform, which provides data, tools, and training to inform coastal decisions by both resource managers and local leaders. NOS also works in partnership with and provides funding to local governments, states, non-profit organizations, and other partners to advance coastal management, research, and education, and engagement through state and territorial coastal zone management and coral programs, as well as the National Estuarine Research Reserves, and the National Coastal Resilience Fund executed in partnerships with the National Fish and Wildlife Foundation..

The following program offices carry out the activities within the Ocean and Coastal Management and Services activity:

- **Office for Coastal Management (OCM)** – Enables and guides implementation of the National Coastal Zone Management (CZM) Program and the National Estuarine Research Reserve System (NERRS) under the Coastal Zone Management Act (CZMA), and delivers useful tools, training, and technical assistance through NOAA's Digital Coast, as defined in the Digital Coast Act. The office also administers the Coral Reef Conservation Program, and supports regional ocean partnerships of coastal states and their efforts to advance regional data portals. In partnership with the National Fish and Wildlife Foundation, the office administers investments of the National Oceans and Coastal Security Fund, providing grants that increase natural infrastructure to protect coastal communities, while enhancing habitats for fish and wildlife. These activities and programs are the means for connecting NOAA data and expertise to actions that advance the Executive Order on Tackling the Climate Crisis at Home and Abroad. The office also supports activities under the Ocean Thermal Energy Conversion Act and the Deep Seabed Hard Mineral Resources Act. (https://coast.noaa.gov/)

- **Office of National Marine Sanctuaries (ONMS)** – is responsible for the stewardship and management of the National Marine Sanctuary System and two marine national monuments: Papahānaumokuākea and Rose Atoll. Within ONMS, the National Marine Protected Areas (MPAs) Center is responsible for developing and coordinating a national system of MPAs to advance national conservation goals and to identify additional areas in need of protection. (https://sanctuaries.noaa.gov/)

Statement of Operating Objectives

Schedule and Milestones:

- Lead national program implementation of the National CZM Program to: develop state- and local-level policies and plans that enhance coastal community resilience; provide improved access to the public; protect or restore coastal habitat, protect or restore coastal habitat (FY 2022-2026)
- Lead national program implementation of the National Estuarine Research Reserve System to develop place-based resilience plans, and support research, training, and education to inform coastal management decisions (FY 2022-2026)
- Designate a new National Estuarine Research Reserve in Connecticut, and progress towards designation of new reserves in Wisconsin, Louisiana, and U.S. Virgin Islands (FY 2022-2026)
- Develop high resolution land cover and impervious surface data in coastal regions to better understand trends and impacts of land use and other management decisions (FY 2022-2026)
- Deliver foundational economic data through economic valuation training, the Economics: National Ocean Watch data and tools, and other economic indicator data for resilience to enable communities to understand the economic impacts, as well as the potential costs and benefits of coastal management decisions (FY 2022-2026)
- Collect additional economic data in the U.S. territories to build out the Economics - National Ocean Watch product for all US states and territories (FY 2022 – 2025)
- Provide decision-support tools, training, and technical assistance that enable coastal communities to understand inundation risk and sea level rise scenarios to support state and local resilience planning (FY 2022-2026)
- Develop and disseminate products that translate natural and social science data to inform climate adaptation strategies and related management decisions (FY 2022)
- Add new data and functionality to Ocean Reports to enhance site selection and assist with environmental review (FY 2022)
- Implement the Coastal Management Fellowship, the Margaret A. Davidson Fellowship, the Digital Coast Fellowship, and National Coral Reef Management Fellowship programs to grow the next generation of coastal leaders
- In partnership with the National Fish and Wildlife Foundation, release an annual Request for Proposals (RFP) and fund projects that restore or expand natural ecosystems to increase protection for communities from coastal hazards while enhancing fish and wildlife habitats

-
- Train Coral Reef Conservation Program (CRCP) jurisdiction partners to use the Manager's Guide to Coral Restoration Planning and Design to create coral restoration plans for each of the seven states and territories (FY 2022-FY 2024)
- Implement best practices to reduce pollutant loadings in U.S. Coral Reef Task Force priority watershed sites and NOAA Habitat Focus Areas and NOAA CRCP key watersheds (FY 2022-2026)
- Train CRCP jurisdiction partners to use the Manager's Guide to Coral Restoration Planning and Design to create coral restoration plans for each of the seven states and territories (FY 2022-FY 2024)
- Implement best practices to reduce pollutant loadings in U.S. Coral Reef Task Force priority watershed sites and NOAA Habitat Focus Areas and NOAA CRCP key watersheds (FY 2022-2026)
- Conduct coral reef assessment and monitoring cruises in the Pacific and Atlantic/Caribbean (FY 2022-2026)
- Expand certification type programs for additional national marine sanctuaries and recreational operators (e.g., boating, charter fishing and commercial snorkel and dive operations) (FY 2022-2026)
- Assess the type, distribution, and intensity of uses in national marine sanctuaries (FY 2022-2026)
- Assess and document status and trends of natural and cultural resources in conjunction with management plan review processes (FY 2022-2026)

Deliverables:

- State-and local-level policies and plans developed to enhance coastal community resilience; public access sites created or enhanced; and acres of habitat protected or restored
- Research applied to local decisions, habitat conserved and restored, training and tools developed to improve decision capacities, and supporting science standards for students (on-going)
- Advances in the capacity and planning for, design, and implementation of natural and nature-based infrastructure to enhance ecosystem and community resilience through the projects funded by the National Oceans and Coastal Security Fund
-

- Data, mapping, tools, and training resources made available through Digital Coast to help state and local communities plan for the effects of coastal flooding, sea level rise, and climate change (on-going)
- On-site and interactive training and job aids to advance successful approaches and best practices to understand risk, increase resilience, and adapt to current and future risks from a changing climate (on-going)

- Enhanced investments in the next generation of coastal leaders and scientists through increased diversity in the fellowship cadre, expanded training to build fellows knowledge and skills, stronger networks across fellowships, enhanced mentor's skills, and increased number of fellows
- Updated Economics - National Ocean Watch ENOW data to characterize the economic and job impacts of ocean and coastal activity (FY 2022 - 2024)
- New data and functionality available via Ocean Reports (on-going)
- Forecasts and models that enable reef managers' monitoring of and response to coral bleaching events (on-going)
- Improved coral bleaching forecasts and ocean acidification models (on-going)
- Management strategies to improve coral reef protection through targeted research to better understand the impacts of stressors to coral reefs (on-going)
- Complete assessments on management effectiveness of 20 MPAs in priority coral reef sites
- A voluntary education and recognition program, modeled after the current Blue Star program, for charter fishing operators working in national marine sanctuaries (e.g., Florida Keys)
- Publications on visitation and uses of various national marine sanctuaries
- Assessments of the resources in each sanctuary, pressures on those resources, the current condition and trends, and management responses to the threats to the marine environment for sanctuaries completing management plan review processes

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Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Explanation and Justification

Comparison by subactivity		2020 Actuals Personnel	2020 Actuals Amount	2021 Enacted Personnel	2021 Enacted Amount	2022 Base Program Personnel	2022 Base Program Amount
Coastal Zone Management and Services	Pos/BA	94	45,018	136	45,890	136	47,179
	FTE/OBL	102	44,650	115	45,890	115	47,179
Coastal Zone Management Grants	Pos/BA	0	76,923	0	78,500	0	78,500
	FTE/OBL	0	77,031	0	78,500	0	78,500
National Oceans and Coastal Security Fund	Pos/BA	0	32,967	0	34,000	0	34,000
	FTE/OBL	0	82,608	0	34,000	0	34,000
Coral Reef Program	Pos/BA	24	29,432	25	33,000	25	33,193
	FTE/OBL	24	28,383	25	33,000	25	33,193
National Estuarine Research Research System	Pos/BA	0	27,454	0	28,500	0	28,500
	FTE/OBL	0	27,565	0	28,500	0	28,500
Sanctuaries and Marine Protected Areas	Pos/BA	178	55,354	188	55,532	186	57,235
	FTE/OBL	176	55,460	179	55,532	177	57,235
Total, Ocean and Coastal Management and Services	Pos/BA	296	267,148	349	275,422	347	278,607
	FTE/OBL	302	315,697	319	275,422	317	278,607

Coastal Zone Management and Services
NOAA and other agencies possess significant science and data capabilities to support coastal resource management, most decisions that affect the resilience of coastal communities occur at state and local levels. NOAA provides national leadership for the National CMZ Program, NERRS, and the National Oceans and Coastal Security Fund; and makes significant scientific expertise, data capabilities, tools, and training available to decision-makers to support state and local decision making.

National CZM Program
The Nation's coasts are managed through coastal and Great Lakes states' and territories' voluntary partnerships with NOAA. Authorized by the CZMA of 1972, the National CZM Program provides the basis for protecting, restoring, responsibly developing, and managing the use of the Nation's diverse coastal zone. The 34 participating states' comprehensive programs balance competing

demands of resource use, economic development, and conservation for approximately 62,000 miles of coastline[19]. This includes developing and implementing strategies to increase coastal community resilience to coastal hazards and climate impacts, managing and conserving valuable coastal ecosystems and their services, and planning and developing coastal access to support community recreation and tourism.

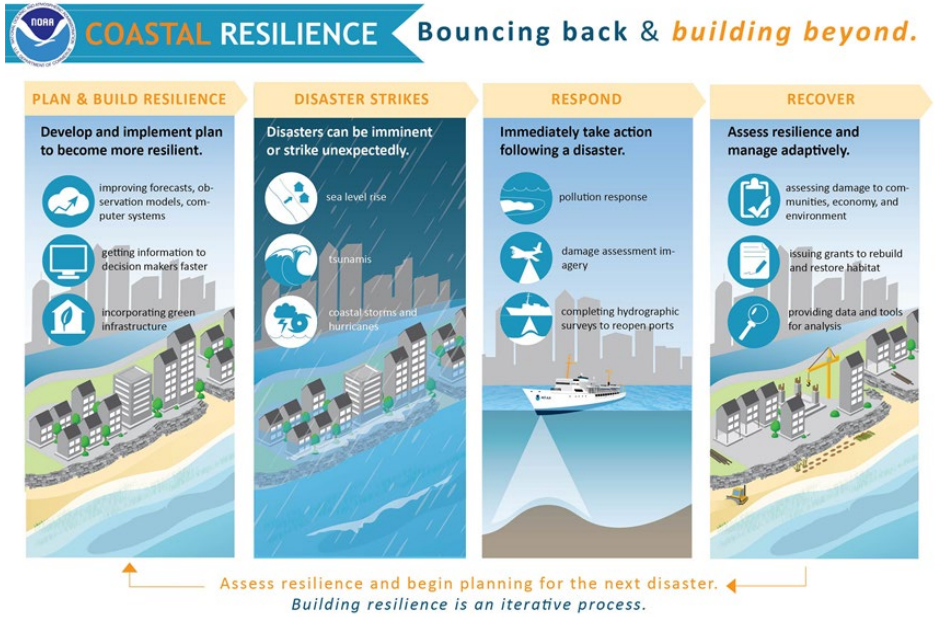
State coastal management programs consider current and future uses in coastal areas, weighing economic, environmental and social considerations. NOAA provides data policy guidance and technical assistance to help states, businesses, and stakeholders navigate complex and interwoven sets of laws and regulations that govern our coastal areas. NOAA also routinely assesses the performance of each state program, measuring progress toward individual state and national program goals and recommending or requiring improvements to those programs. Under CZMA, participating states have the authority to review all Federal activities that have reasonably foreseeable effects on any coastal use or natural resource of their coastal zone towards ensuring that they are consistent with enforceable policies of their state programs.

NOAA's training, geospatial resources and decision support tools provide actionable information and skills needed by the CZM Programs and coastal communities to ensure that they continue to thrive and serve as engines for economic growth. The Digital Coast provides easy access to data, information, tools, and training to help communities address coastal issues, including 5.5 trillion points of lidar, 37 terabytes of imagery, 800,000 square miles of land cover, over 70 tools with over 140 use examples, and 226 learning products[20]. OCM trained more than 2500 coastal professionals in 2020. A NOAA study estimated a cost-benefit ratio of 1:3 for Digital Coast, with net benefits of $25 million. Tools like the Coastal County Snapshots that depict flood risk and economic impact of the ocean economy contribute to this benefit. In February 2021, a non-governmental organization documented the "Societal Value of NOAA's Digital Coast," estimating the value of the Digital Coast Academy at $1.8 to $9.7 million annually. One tool in the Digital Coast portfolio, the Sea Level Rise Viewer, integrates flood projection maps, digital elevation models, and realistic visualizations to show planners and engineers how flooding affects landmarks and infrastructure[21]. The 2021 study above estimated the economic value of using the Sea Level Rise Viewer and Coastal Flood Exposure Mapper in Jackson, Mississippi, to relocate wastewater treatment plants to higher ground and avoid impacts of future flood risks[22]. These plants treat 13 million gallons of wastewater daily, serving five cities including 80 percent of Jackson County's population. Based on the cost of past damages from Hurricanes Katrina and Nate, as well as time saved to complete the study, the organization estimated a one-time benefit of $1.1 million to $2.2 million in

[19] https://coast.noaa.gov/data/docs/states/shorelines.pdf
[20] https://coast.noaa.gov/digitalcoast/
[21] https://coast.noaa.gov/slr/
[22] https://coast.noaa.gov/digitalcoast/tools/flood-exposure.html

2014 dollars, though these products are used thousands of times annually for a range of uses across the country[23]. Zillow completed a study in 2017 using NOAA's Digital Coast tools that showed six feet of sea level rise would affect 1.9 million homes and $882 billion in real estate value along the East and Gulf Coasts[24].

NOAA's technical assistance resources help states to protect economically significant infrastructure, which is increasingly at risk. A 2019 study by the Congressional Budget Office estimates that losses to the U.S. economy caused by hurricane winds and storm-related flooding, result in annual costs of $54 billion.[25] In California, the CZM Program worked with NOAA to assess flood and seismic vulnerabilities of transportation assets in Alameda and Contra Costa counties. A similar plan developed by Texas coastal management agencies with NOAA assistance will protect critical energy infrastructure and waterborne commerce passing through the Gulf Intracoastal Waterway valued at $25 billion annually[26]. The Georgia CZM program raised a causeway—the only road to Tybee Island—to mitigate flood risks that it identified using NOAA tools. The road is essential to recreation and tourism in the area[27].



NOAA's support for regional data sharing and integration will continue to provide ocean-related Federal data and information to the public to inform regional, coastal, and ocean management decision making across the U.S.

[23] https://coast.noaa.gov/digitalcoast/stories/wastewater-treatment.html
[24] https://www.zillow.com/research/climate-change-underwater-homes-12890/
[25] https://www.cbo.gov/system/files/2019-04/55019-ExpectedCostsFromWindStorm.pdf
[26] https://www.glo.texas.gov/coast/coastal-management/forms/files/shoring-up-our-future.pdf
[27] https://coast.noaa.gov/digitalcoast/stories/tybee.html

Coastal Zone Management Grants

U.S. coastal communities are home to over 127 million people, support 57.5 million jobs, and contribute more than $9.0 trillion to the U.S. economy, accounting for 46 percent of the nation's economic output[28]. CZM Grants assist states with planning and managing uses in coastal areas, including preparing for and responding to coastal hazards. Over the history of the Program, participating states and territories have partnered to enhance coastal community resilience, support vibrant coastal economies, and address the multiple uses of coastal areas in a way that maximizes benefits for all. In recent years, programs participating in the National CZM Program have: completed over 2,000 projects that enhance resilience to coastal hazards; worked with over 2,900 communities to grow in a balanced way that protects coastal community character; protected over 64,000 acres of habitat and restored an additional 75,000 acres; created more than 1,100 new sites for the public to access coastal areas; and trained nearly 200,000 coastal decision makers[29].

National Oceans and Coastal Security Fund

The National Oceans and Coastal Security Fund supports the National Coastal Resilience Fund (NCRF), which is a partnership between the National Fish and Wildlife Foundation (NFWF) and NOAA. In FY 2021, the fund will invest up to $34 million for projects that enhance the resilience of coastal communities to flooding and inundation by restoring or expanding natural ecosystems, while enhancing fish and wildlife habitats and increasing protection for communities from coastal hazards[30]. This year, NCRF will support at least $3 million in community capacity building and planning projects. Investments through this program will lead to the restoration of hundreds to thousands of acres of habitat, protection of critical infrastructure from flooding, and job creation in communities across the country. In 2020, NOAA and NFWF awarded $37 million for 46 projects in 25 states and territories. The total investment, including non-federal match and contributions, was more than $92 million[31]. However, demand for this program continues to be high. In 2020, nearly 300 pre-proposals totaling $172 million in requests were submitted, which meant over $135 million in requests were unfunded. The NCRF provides a means to address the climate crisis and chronic environmental changes such as sea level rise by investing in natural solutions that are in many cases able to adapt to those changes, as contrasted to hard structural solutions that have a finite lifetime and repeated costs for the maintenance of protective measures.

National Estuarine Research Reserve System (NERRS)

The NERRS is a national network of state-managed protected areas established under the CZMA. The NERRS is a partnership between participating states and NOAA. Per program regulations, NOAA provides 70 percent of the funding and states provide the

[28] https://coast.noaa.gov/states/fast-facts/economics-and-demographics.html
[29] https://coast.noaa.gov/data/czm/media/funding-summary.pdf
[30] https://www.nfwf.org/media-center/press-releases/nfwf-announces-release-national-coastal-resilience-fund-2021-request-proposals
[31] https://www.nfwf.org/media-center/press-releases/nfwf-and-noaa-announce-more-37-million-grants-support-coastal-resilience-efforts-across-nation

remaining 30 percent of the funding for reserve operations, research, monitoring, training and education. NOAA provides national guidance, program oversight, and technical assistance while state agencies and universities perform day-to-day operations and management of individual reserves with input from local partners.

The network of 29 unique reserves, representative of the variety of estuaries across the country, protects over 1.3 million acres of state-owned estuarine lands and waters. Currently, reserves are located in 23 states and territories[32]. They are economically significant areas that attract recreation and tourism activity, support commercial and recreational fisheries, and provide natural infrastructure for coastal protection and water quality. The NERRS have contributed billions of dollars to the shellfish and seafood industry in participating states and tens of billions of dollars in ocean-dependent industries. Coastal wetlands, such as those protected by the NERRS, provide $23.2 billion in storm protection each year[33]. Additionally, the reserves help communities plan for current and future hazards, ultimately protecting life, property and economy. According to a study by the National Institute of Building Sciences, each dollar spent on mitigation activities and planning, communities can save $6 in future recovery costs[34].

The NERRS conducts research and monitoring of coastal habitats through the Davidson Fellowship Program, the NERRS Science Collaborative Program, and the System-Wide Monitoring Program. The System-Wide Monitoring Program generates long-term datasets on water quality, weather, and habitat condition and extent to support local and state decision-makers and Federal agencies. The NERRS Science Collaborative and the Davidson Fellowship Program are competitive grant programs supporting projects that contribute to improving coastal resilience to natural and man-made changes. NOAA awards an average of $6.0 million each year in competitive grants that fund user-driven collaborative research, assessment, and transfer activities that address coastal management needs identified by the reserves. Additionally, the NERRS brings the science and technical capacity to local and state decision-makers through training, tools, and technical assistance to address management challenges, as well as to teachers and students through instructional and experiential education programs that engage them in their local communities' coastal challenges.

Coral Reef Program

NOAA's CRCP brings together multidisciplinary expertise from across NOAA to conserve and restore coral reefs. The program has partnerships with state, jurisdictional and international coastal resource managers. Coral reefs are among the most biologically diverse ecosystems in the world, providing a range of economic benefits and vital ecosystem services such as food, recreation,

[32] https://coast.noaa.gov/nerrs/about/
[33] https://coast.noaa.gov/states/fast-facts/natural-infrastructure.html
[34] https://coast.noaa.gov/states/fast-facts/hazard-mitigation-value.html

marine habitat, medicines, coastal protection, climate regulation, and biodiversity. A study in 2009 estimated the average annual value of these ecosystem services at $352,000 per hectare of reef[35]. More recently, a 2019 U.S. Geological Survey report estimated that coral reefs along the coast of the U.S. annually avoided flooding to more than 18,000 people, worth more than $825 million to more than 5,500 buildings. They avoided flooding to more than 33 critical infrastructure facilities, including utilities and transportation systems, and indirect damages of almost $700 million in economic activity[36]. Rapid declines in coral reefs have dire consequences for approximately one billion people who depend on coral reefs for their food and livelihoods. Climate change is the main global threat to coral reefs and exacerbates more locally-based threats including water quality decline and unsustainable fishing practices making corals more susceptible to becoming diseased. No matter how remote, climate change threatens every U.S. coral reef.

CRCP integrates coral protection efforts across NOAA and other agencies to address overfishing, harmful fishing practices, ocean temperature changes, ocean acidification, land-based sources of pollution, and other threats. The CRCP Strategic plan is predicated on resilience based management and the following three concepts: an understanding of past, present, and projected future impacts to coral reefs caused by a changing climate; likely social and ecological responses to climate change; and identification and prioritization of management actions to support ecosystem resilience and human well-being. The program's approaches include ecosystem-based management initiatives to build MPA management capacity; monitoring and forecasting of threats to coral reefs; advancing coral restoration research and ecosystem-scale restoration implementation; and partnerships to address and reduce impacts of land-based sources of pollution. Land-based sources of pollution are major threats to coral reef ecosystems. NOAA works with jurisdictions that are upstream of coral reefs to develop 'ridge to reef' watershed management plans. These plans ensure that coral reef ecosystems are integrated into watershed planning processes.

Sanctuaries and Marine Protected Areas

National Marine Sanctuaries

NOAA will celebrate its 50th anniversary in FY 2022, serving as the trustee for a system of 14 national marine sanctuaries and two marine national monuments. These underwater parks range in size from the one square mile Monitor National Marine Sanctuary near Cape Hatteras, North Carolina, to the 582,000 square mile Papahānaumokuākea Marine National Monument along the northwestern portion of the Hawaiian Archipelago. Together these areas encompass approximately 622,000 square miles of ecologically significant marine habitats and maritime heritage assets (such as shipwrecks and cultural landscapes). National Marine

[35] Costanza, R., R. de Groot, P. Sutton, S. van der Ploeg, S.J. Anderson, I. Kubiszewski, S. Farber, and R.K. Turner. 2014 Changes in the global value of ecosystem services. Global Environmental Change 26: 152-158. (pdf, 508k) http://www.reefresilience.org/coral-reefs/reefs-and-resilience/value-of-reefs/

[36] Storlazzi, C.D., Reguero, B.G., Cole, A.D., Lowe, E., Shope, J.B., Gibbs, A.E., Nickel, B.A., McCall, R.T., van Dongeren, A.R., and Beck, M.W., 2019, Rigorously valuing the role of U.S. coral reefs in coastal hazard risk reduction: U.S. Geological Survey Open-File Report 2019–1027, 42 p., https://doi.org/10.3133/ofr20191027.

Sanctuaries support local coastal and ocean dependent economic activities such as commercial fishing, research and recreation/tourism-related activities.

In 2019, NOAA designated the Mallows Bay-Potomac River National Marine Sanctuary, the first national marine sanctuary designated since 2000. This sanctuary protects more than 100 historically-significant shipwrecks and related maritime heritage resources in an 18-square mile stretch. NOAA continues to work with interested local communities on several other potential sanctuaries, specifically the proposed sanctuaries in Lake Ontario and Wisconsin-Lake Michigan, which will help conserve nationally significant shipwrecks and related maritime and cultural heritage resources. Collectively, the proposed two new sanctuaries represent opportunities for NOS to protect 2,775 square miles of water, containing 58 known shipwrecks, with the potential of an additional 47 shipwrecks, and over 200 years of our Nation's history. NOAA is also working on the sanctuary designation of Papahānaumokuākea Marine National Monument, as directed by Congress. This area is already protected, though as a sanctuary, management activities in Papahānaumokuākea would expand. New sanctuaries designated with program funds will have broad-based community support, protect and celebrate the Nation's maritime cultural heritage and natural resources, and expand economic development, recreation and tourism, and educational opportunities.

In FY 2020 NOAA took important steps towards protecting and restoring ecological resources in our Sanctuaries. Beginning in FY 2020 and finalizing in FY 2021, NOAA expanded the Flower Garden Banks National Marine Sanctuary from 56 square miles to 160 square miles, protecting additional critical habitat in the Gulf of Mexico. NOAA and partners also announced a decades-long coral reef restoration effort, Mission: Iconic Reefs to restore seven iconic reefs in Florida Keys National Marine Sanctuary[37]. The groundbreaking approach aims to revitalize the Florida Keys' highly diverse and economically valuable marine ecosystem on an unprecedented scale, and represents one of the largest ever investments in coral restoration. This effort is collaborative across Federal, state, and local entities and complements NOAA's ongoing Florida Keys Restoration Blueprint and management plan review.

NOS protects these ecological and cultural assets through community engagement, applied resource protection and management, research and monitoring, education, and public outreach activities. It develops and implements comprehensive management plans to ensure the protection and sustainable use of resources. NOAA tailors each plan to the specific goals of each national marine sanctuary, which in turn reflect the unique resources and needs of each sanctuary's respective community. NOAA's partnerships facilitate research and monitoring and enforce the laws and regulations that protect sanctuary resources. Community engagement is a cornerstone of a site's management. Sites build and rely on volunteer participation and community input to manage the resource.

[37] https://www.fisheries.noaa.gov/southeast/habitat-conservation/restoring-seven-iconic-reefs-mission-recover-coral-reefs-florida-keys

NOAA works in eight states with Ocean Guardian Schools, which receive grants to work with students on local conservation projects. In FY 2019, volunteers logged almost 118,000 hours supporting science, education, and public engagement programs to raise awareness and meet science needs of the sanctuaries. Over 40,000 youth participated in hands-on learning in national marine sanctuaries and ONMS engaged 5,000 students from underrepresented communities. In FY 2020, due to the COVID-19 pandemic, in-person outreach efforts were canceled after March 2019. In response, ONMS focused on education and outreach engagement on virtual spaces, and has reached a significant number of students and the public through virtual content, such as 360° underwater virtual reality, and events such as Exploring by the Seat of Your Pants and a webinar series. As an example, the National Marine Sanctuaries Webinar Series also saw a 449 percent increase in interest from FY 2019 to FY 2020, attracting thousands of live viewers. ONMS expects to increase in person opportunities again beginning in FY 2021.

Boats for research, monitoring, and emergency response are essential to site management, especially in areas such as the Florida Keys National Marine Sanctuary. NOS maintains and repairs a fleet of small boats to access protected areas for research, monitoring, outreach, and emergency support. Periodic assessments help to determine whether any refurbishments or upgrades are needed to maintain boat safety and legal compliance, mission effectiveness, or extend boats'' service life. Upgrades can include hull form modification, propulsion system revision and replacement, and upgrades of scientific, navigational, load handling, and auxiliary systems. NOS periodically performs large scale maintenance, refurbishments, or upgrades to maintain craft safety, mission effectiveness, or to extend a boat's service life.

In order to establish better understanding and appreciation for sanctuary and other ocean resources by the public, NOAA develops and maintains a network of exhibits and signage. Whenever possible, NOAA develops content and exhibits as cooperative centers at existing aquaria, museums and other appropriate facilities to engage the public and environmental decision makers on conservation issues. In FY 2020, NOAA opened the Kauai Ocean Discovery facility in partnership with the National Marine Sanctuary Foundation and Kukui Grove Shopping Center. This is the only admission-free, marine-oriented environmental education facility on Kaua`i, and is expected to increase the sanctuary's outreach and impact on the island by supporting tourism and expanding volunteer programs and partnerships with other agencies and institutions.

MPA Coordination

NOAA's MPA Center develops science, policy, and management tools to advance the effective use of MPAs for national conservation and management objectives. The MPA Center coordinates various Federal, state, and tribal MPA programs to better integrate the national system of MPAs, including national estuarine research reserves and national marine sanctuaries. This coordination focuses on developing curricula, trainings, and virtual tools to improve management capacity of MPA programs around

the world. MPAs are being increasingly recognized as a key tool for maintaining and restoring ecosystem resilience in a changing climate. MPAs can also provide long term protection for "blue carbon" - coastal habitats including salt marshes, kelp forests, seagrasses and mangroves that provide long term storage for atmospheric carbon and coastal protection. The Center also coordinates internationally with agencies that manage sites which share migratory species with the U.S. or have similar habitat and management challenges. In FY 2020, the MPA center, in partnership with the UN Environment Programme North America Office and national partners in Canada and Mexico, organized national and tri-national Dialogues of the North American Marine Protected Areas Network (NAMPAN). NAMPAN is a network of agencies and MPA managers with mandates to protect marine ecosystems and biodiversity and contribute to thriving coastal communities and economies.

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(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Coastal Zone Management and Services	Pos./BA	136	47,179	144	56,179	8	9,000
	FTE/OBL	115	47,179	121	56,179	6	9,000

Advancing Racial Equity through NOS Products and Services for Coastal Resilience (+$9,000, 6 FTE/8 Positions) – NOAA requests additional funding to make specific and systemic changes to engagement, service delivery, and training to equip coastal communities, especially those with underserved populations, with improved capacity to address coastal hazards. Underserved and minority communities suffer disproportionate impacts from hazards and climate change, and further from a disproportionate allocation of financial resources away from their communities after disasters. NOAA will build upon its existing suite of coastal resilience products and services, including through the expansion of equity assessments and analysis of that data, to ensure more equitable access and greater usability for a broader portion of the coastal population.

NOAA will improve delivery and impact of equitable products and services by: increasing internal capacity to understand and address racial equity and accessibility constraints; engaging those working most directly with underserved communities to improve development and delivery of our products and services; providing resources to coastal partners so they can advance racial equity at the state and local level; and, incorporating diversity and accessibility data in tools and engaging more minorities in the field of coastal management. This approach leverages NOAA's current expertise in providing products and services to the coastal management community, and begins with equity assessments to uncover barriers and constraints to serving diverse communities. It will require expanding outreach and engagement efforts to be more inclusive of minorities and underserved populations, and building collaborative partnerships with trusted entities already engaged on racial equity issues. These investments will drive modifications to our products and services to ensure they contribute to advancing racial equity.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

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Schedule and Milestones:
FY 2022 – FY 2026

- Hire Equity Leader, Coordinator, Lead Software Developer and Workforce Developer to lead, manage and coordinate equity efforts across OCM and with partners (FY 2022)
- Engage and convene equity experts to provide direction, and conduct trainings to enhance knowledge and skills in addressing inequities systemically (FY 2022 - FY 2025)
- Plan and implement the OCM equity assessment(s) including an FY 2021 pilot assessment focused on Digital Coast tools, products, and services (FY 2022 - FY 2023)
- Identify, acquire, and develop appropriate data to monitor progress on equity efforts and enhance decision support tools, mapping, and service delivery (FY 2022 - FY 2026)
- Adopt new policies and develop products and service delivery practices that advance racial equity (FY 2023 - FY 2026)
- Identify and establish relationships with appropriate equity organizations to inform necessary revisions to products and services for coastal management (FY 2023 - FY 2026)
- Enhance or develop new decision support tools by filling data gaps in underserved regions (e.g., U.S. Territories, Alaska, and tribal lands) (FY 2022 - FY 2026)
- Build upon existing regional structure and strong partnership networks with coastal communities, ensuring effective service delivery through sustained engagement with underserved communities (FY 2022 - FY 2026)
- Conduct needs assessment at regional and local levels with underserved communities. Share information across NOAA offices (FY 2024 - FY 2026)
- Increase accessibility to trainings and learning events (FY 2022 - FY 2026)
- Increase student opportunities in coastal fields from underrepresented populations through educational opportunities, fellowships and recent graduate opportunities (FY 2023 - FY 2026)
- Based on identified needs, work with partners to plan and implement increased technical assistance and training to enhance whole-of-community resilience (FY 2025 - FY 2026)

Deliverables:

- Recommendations for changes to advance racial equity through NOS products and services based on completed equity assessments
- Enhanced offerings and accessibility of Digital Coast data, tools, and training through language translation, accessibility for learning events, technical assistance and tutorials for data and tools
- Increased data (geographically, type, and scale of) relevant to racial equity made accessible for coastal decision making

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- Increased participation by underserved populations in coastal educational and fellowship opportunities
- Increased knowledge, skills, and decision support resources for the coastal communities to engage with underserved populations

Performance Measures	2022	2023	2024	2025	2026
Number of products and services modified to better meet equity needs[38] (cumulative)					
With Increase	10	25	40	55	70
Without Increase	5	10	15	20	25
Number of engagements per year with representatives from underserved populations (regionally)					
With Increase	20	40	80	80	80
Without Increase	10	10	10	10	10
Outyear Costs:					
Direct Obligations	9,000	9,000	9,000	9,000	9,000
Capitalized	0	0	0	0	0
Uncapitalized	9,000	9,000	9,000	9,000	9,000
Budget Authority	9,000	9,000	9,000	9,000	9,000
Outlays	5,580	5,580	5,580	5,580	5,580
FTE	6	8	8	8	8
Positions	8	8	8	8	8

[38] Examples include translations into a different language, inclusion of racial equity data, making products and services more accessible to a diverse audience, etc.

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PROGRAM CHANGE PERSONNEL DETAIL

Activity: Ocean and Coastal Management and Services
Subactivity: Coastal Zone Management and Services
Program Change: Advancing Racial Equity through NOS Products and Services for Coastal Resilience

Program Change:

Title		Grade	Number	Annual Salary	Total Salaries
Equity Leader/Program Manager		ZA-04	1	159,000	159,000
Equity Coordinator/Program Coordinator		ZA-3/4	1	113,000	113,000
Equity Workforce Development		ZA-03	1	113,000	113,000
Lead Software Development		ZP-04	1	142,000	142,000
Coastal Management Equity Sppecialist		ZA-2/3	4	105,000	420,000
Total			8		947,000
Less lapse	25.00%		(2)		(236,750)
Total full-time permanent (FTE)			6		710,250
2022 Pay Adjustment (2.7%)					19,177
					729,427

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	6
Total FTE	6
Authorized Positions:	
Full-time permanent	8
Total Positions	8

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Ocean and Coastal Management and Services
Subactivity: Coastal Zone Management and Services

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	12,702	13,692	14,484	15,213	729
11.3	Other than full-time permanent	213	0	0	0	0
11.5	Other personnel compensation	214	161	161	161	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	13,129	13,853	14,645	15,374	729
12	Civilian personnel benefits	4,568	4,236	4,720	4,997	277
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	400	0	0	0	0
22	Transportation of things	29	10	10	110	100
23	Rent, communications, and utilitites	1,372	760	761	761	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	32	3	3	3	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	18,925	25,386	25,398	31,892	6,494
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	223	332	332	432	100
31	Equipment	0	0	0	300	300
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	2,759	1,310	1,310	2,310	1,000
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
77	Overhead	3,213	0	0	0	0
99	Total obligations	44,650	45,890	47,179	56,179	9,000

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Coastal Zone Management and Services	Pos./BA	136	47,179	145	54,679	9	7,500
	FTE/OBL	115	47,179	122	54,679	7	7,500

Regional Coastal Resilience Communities of Practice (+$7,500, 7 FTE/9 Positions) – NOAA requests additional funding to translate climate data and information into tools, services, and training that can be used for decision-making. NOAA will connect and convene technical experts, decision-makers, and community stakeholders to ensure climate adaptation strategies and investments identified to improve resilience are science-based and community-driven. This will be done by reinforcing and empowering existing resilience Communities of Practices (CoP) with sustained funding, and establishing new, regionally-based coastal resilience CoPs, where needed. Thanks to the increased capacity that this new funding will bring, NOAA will hire a coordinator for each of the eight regions to lead the support of existing and/or initiation of new regional CoPs, represent NOAA in engagement of Federal and state agency partners, track and prioritize resources, and guide contract staff. A national coordinator will lead cross-regional knowledge transfer, connections to interagency mitigation and resilience groups, and tracking of performance measures. NOAA will also support catalyst projects in each of the regions to share approaches and successes across the network. These staff will lead cross-regional information-sharing, connections to interagency mitigation and resilience data and resources, and performance tracking. Staff will also direct funding for catalyst projects that will advance progress to address identified challenges and demonstrate resilience outcomes in the regions. Catalyst projects would be supported through both grants and contracts.

The CoPs will engage coastal practitioners, sharing regionally-relevant information, such as emerging adaptation strategies, options for adaptation financing, and equitable adaptation solutions. NOAA will utilize its Digital Coast delivery platform as a mechanism for CoPs to build knowledge and skills for coastal practitioners through training and learning resources and to share new products and services that emerge to address coastal resilience (risk communication, adaptation, natural infrastructure, inundation mapping).

CoPs bring together individuals from local, state, and Federal governments, academia, non-profit organizations and the private sector to accelerate the sharing and building of trust through the application of emerging knowledge and technical information, making them a key strategy in the race to adapt to climate change. CoPs are also a valuable forum for convening underserved communities and

identifying pathways towards equitable adaptation. More information on CoPs can be found at https://hbr.org/2000/01/communities-of-practice-the-organizational-frontier.

There is an increasing need for NOAA to create and foster natural and economic resilience along our coasts through support, expertise and robust, on-the-ground partnerships and place-based conservation activities. Ecological restoration and community resilience, as outlined in EO 14008, are integral to NOAA and the Administration's climate strategy.

Schedule and Milestones:
FY 2022 – FY 2026

- Assess current coastal resilience CoPs, resilience activities, and needs in regions to determine scope and focus of support for each region (FY 2022)
- Hire eight Federal coordinators and develop and contract for up to 16 early career professionals to support and/or establish CoPs in eight identified regions (two per region); hire one national coordinator to oversee activities (FY 2022)
- Initiate national network of regional resilience CoPs to develop, deliver, and share data, tools, and training between and among communities and organizations to enhance resilience (FY 2023 - 2026)
- Identify key resilience individuals and organizations; establish and grow relationships; and establish communication channels and protocols for engaging and sharing information (FY 2023 - 2024)
- Leverage CoPs to assess on-going gaps and constraints to community resilience (FY 2023 - 2026)
- Host peer to peer sharing and learning events (FY 2023 - 2026)
- Identify, select, and fund "catalyst projects" that will benefit communities and that can be shared via the Communities of Practice and other learning networks (FY 2024 -2026)

Deliverables:

- A national network of regional CoPs to accelerate learning for agencies, organizations, and coastal communities to: assess needs; share data and tools; solve problems; and empower communities and spur innovation to enhance resilience
- Annual summary of science and product needs that is distributed and communicated to appropriate NOAA offices and other Federal entities each year
- Over 200 agencies, organizations, and community groups exposed to and learning from NOAA data, tools, and training per year. Anticipate numbers will increase from 200 in FY 2022 to 292 in FY 2026
- Five or more NOAA products and services modified to better address resilience needs of coastal communities per year
- 10 catalyst projects at the regional or community level addressing and enhancing community resilience per year

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(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of agencies, organizations, and community groups working regionally to address common resilience challenges using NOAA data, tools, and training per year					
With Increase	200	220	242	266	292
Without Increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	7,500	7,500	7,500	7,500	7,500
Capitalized	0	0	0	0	0
Uncapitalized	7,500	7,500	7,500	7,500	7,500
Budget Authority	7,500	7,500	7,500	7,500	7,500
Outlays	4,650	4,650	4,650	4,650	4,650
FTE	7	9	9	9	9
Positions	9	9	9	9	9

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PROGRAM CHANGE PERSONNEL DETAIL

Activity: Ocean and Coastal Management and Services
Subactivity: Coastal Zone Management and Services
Program Change: Regional Coastal Resilience Communities of Practice

Title		Grade	Number	Annual Salary	Total Salaries
Program Analyst		ZA-04	1	145,000	145,000
Management and Program Analyst		ZA-3/4	8	150,000	1,200,000
Total			9		1,345,000
Less lapse	25.00%		(2)		(336,250)
Total full-time permanent (FTE)			7		1,008,750
2022 Pay Adjustment (2.7%)					27,236
					1,035,986

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	7
Total FTE	7
Authorized Positions:	
Full-time permanent	9
Total Positions	9

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
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PROGRAM CANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Ocean and Coastal Management and Services
Subactivity: Coastal Zone Management and Services

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	12,702	13,692	14,484	15,518	1,034
11.3	Other than full-time permanent	213	0	0	0	0
11.5	Other personnel compensation	214	161	161	161	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	13,129	13,853	14,645	15,679	1,034
12	Civilian personnel benefits	4,568	4,236	4,720	5,113	393
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	400	0	0	290	290
22	Transportation of things	29	10	10	10	0
23	Rent, communications, and utilitites	1,372	760	761	761	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	32	3	3	3	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	18,925	25,386	25,398	30,031	4,633
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	223	332	332	482	150
31	Equipment	0	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	2,759	1,310	1,310	2,310	1,000
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
77	Overhead	3,213	0	0	0	0
99	Total obligations	44,650	45,890	47,179	54,679	7,500

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(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Coastal Zone Management and Services	Pos./BA	136	47,179	136	47,479	0	300
	FTE/OBL	115	47,179	115	47,479	0	300

Enterprise Infrastructure Solutions (EIS) (+$ 300, 0 FTE/0 Positions) – This increase will enable NOAA to conduct a technology modernization and support an accelerated transition of telecommunications services to the GSA EIS contract vehicle. DOC currently uses GSA's Networx, Washington Interagency Telecommunications System 3, and regional contracts to acquire telecommunication services. These contracts expire in May 2023. Between now and then, DOC will be transitioning telecommunications services to the GSA EIS follow-on contract. Additional EIS requests can also be found in Mission Support (MS-65), NOS (NOS-48, NOS-88, NOS-149), NMFS (NMFS-71), NWS (NWS-24, NWS-127, NWS-182), NESDIS (NESDIS-37), and OMAO (OMAO-19).

The modernization enables NOAA to re-architect its network infrastructure to gain efficiencies and resilience, realize significantly reduced costs for network services after transition, and minimize risk as legacy services are discontinued. Increased funding will accelerate the transition and enable NOAA to: (a) contract for engineering services to re-architect the network infrastructure and establish detailed transition plans; (b) issue awards for new hardware and telecommunication services; (c) trench and lay new lines, decommission and provision circuits; and (d) establish funding for administrative services to provide ordering, invoice processing, and inventory management. By expediting the technology modernization and migration to the new EIS vendors, NOAA will realize significant reductions in price and cost-avoidance. This funding will reduce risks related to service delivery and operations due to termination of GSA legacy service contracts.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022 - 2026
- Award NOAA task orders under EIS to support modernization needs
- Establish a sustainable, resilient architecture to meet NOAA's current and planned needs

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

- Transition 100% NOAA Legacy GSA inventory to EIS

Deliverables:

- Modernized telecommunications infrastructure capable of meeting the agency's mission
- Provide a centralized ordering and management platform
- Provide a secure infrastructure resistant to extreme weather impacts

Performance Measures	2022	2023	2024	2025	2026
Transition of NOAA Telecommunication services to GSA's EIS					
With Increase	35%	60%	80%	100%	0%
Without Increase	20%	45%	55%	65%	75%
*Assumes full funding of EIS initiatives NOAA-wide					
Outyear Costs:					
Direct Obligations	300	300	300	300	300
Capitalized	0	0	0	0	0
Uncapitalized	300	300	300	300	300
Budget Authority	300	300	300	300	300
Outlays	300	300	300	300	300
FTE	0	0	0	0	0
Positions	0	0	0	0	0

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Ocean and Coastal Management and Services
Subactivity: Coastal Zone Management and Services

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	12,702	13,692	14,484	14,484	0
11.3	Other than full-time permanent	213	0	0	0	0
11.5	Other personnel compensation	214	161	161	161	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	13,129	13,853	14,645	14,645	0
12	Civilian personnel benefits	4,568	4,236	4,720	4,720	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	400	0	0	0	0
22	Transportation of things	29	10	10	10	0
23	Rent, communications, and utilitites	1,372	760	761	761	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	300	300
24	Printing and reproduction	32	3	3	3	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	18,925	25,386	25,398	25,398	0
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	223	332	332	332	0
31	Equipment	0	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	2,759	1,310	1,310	1,310	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
77	Overhead	3,213	0	0	0	0
99	Total obligations	44,650	45,890	47,179	47,479	300

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Coastal Zone Management Grants	Pos./BA	0	78,500	0	108,500	0	30,000
	FTE/OBL	0	78,500	0	108,500	0	30,000

Increasing Community Resilience Through Coastal Management Grants (+$30,000, 0 FTE/0 Positions) – NOAA requests an increase to provide enhanced support to the National CZM Program, a partnership between NOAA and coastal states and territories, with a focus on increasing coastal community resilience. This increase will enable NOAA's state and territorial partners to expand the reach and impact of the collaborative coastal zone management programs, including through advancing hazard- and climate-resilience planning and implementation. The Federal Funding Opportunity announcement will require recipients to implement projects that prepare for, and enhance resilience to, storms, flooding and inundation, erosion, sea-level rise and lake-level changes, tsunamis, and other natural hazards that are affecting U.S. coastlines. NOAA support will better equip state and territorial coastal management programs with resources to: conduct coastal vulnerability assessments; develop plans, design and implement resilience projects; and evaluate effectiveness of resilience strategies through long-term monitoring efforts. As part of this work, programs would provide technical assistance, training, and grants to local governments.

These grants will increase jobs and the economic benefits within communities, including for historically underserved populations, while minimizing future damages from coastal flooding and reducing negative economic impacts over time. Increased support for the National CZM Program will further enable state and territorial coastal management programs to add and enhance public-access sites across the Nation (connecting all people to the coasts), protect and restore coastal habitat (providing benefits to fish and wildlife, as well as enhanced coastal protection for communities), and advance coastal and ocean planning that identifies and addresses multiple uses, such as the potential for offshore renewable energy.

There is an increasing need for NOAA to create and foster natural and economic resilience along our coasts through support, expertise and robust, on-the-ground partnerships and place-based conservation activities. Ecological restoration and community resilience, as outlined in EO 14008, are integral to NOAA and the Administration's climate strategy.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022 – FY 2026

- Execute funds as part of the annual process to develop cooperative agreements between NOAA and the state and territorial coastal management programs through the National CZM Program (FY 2022 – FY 2026)
- Support the implementation of local policies, plans, and projects that reduce future damage from hazards (including climate impacts) (FY 2022 – FY 2026)
- Support increased access to coastal areas (FY 2022 – FY 2026)
- Support efforts to protect (through acquisition or easement) and restore coastal habitat (FY 2022 – FY 2026)

Deliverables:

- 50 local-level policies and plans completed (per year) to reduce future damage from hazards
- 105 local-level projects completed (per year) to reduce future damage from hazards including climate impacts
- 120 public-access sites created or enhanced (per year)
- 11,000 acres of habitat protected (per year) through acquisition or easement.
- 11,000 acres of habitat under restoration (per year)

Performance Measures	2022	2023	2024	2025	2026
Number of local-level projects completed to reduce the future damage from coastal hazards					
With Increase	105	210	315	420	525
Without Increase	75	150	225	300	375
Number of local-level policies and plans completed to reduce the future damage from coastal hazards with assistance from the CZM program					
With Increase	50	100	150	200	250
Without Increase	35	70	105	140	175

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Number of acres of habitat under restoration, with assistance from the CZM program					
With Increase	11,000	22,000	33,000	44,000	55,000
Without Increase	9,200	18,400	27,600	36,800	46,000
Outyear Costs:					
Direct Obligations	30,000	30,000	30,000	30,000	30,000
Capitalized	0	0	0	0	0
Uncapitalized	30,000	30,000	30,000	30,000	30,000
Budget Authority	30,000	30,000	30,000	30,000	30,000
Outlays	18,600	18,600	18,600	18,600	18,600
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Ocean and Coastal Management and Services
Subactivity: Coastal Zone Management Grants

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	0	0	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	0	0	0	0	0
12	Civilian personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	0	0
22	Transportation of things	0	0	0	0	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	0	0	0	0	0
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	0	0	0	0	0
31	Equipment	0	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	77,031	78,500	78,500	108,500	30,000
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	77,031	78,500	78,500	108,500	30,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
National Oceans and Coastal Security Fund	Pos./BA	0	34,000	1	68,000	1	34,000
	FTE/OBL	0	34,000	1	68,000	1	34,000

Increasing Coastal Resilience Through Nature-Based Approaches (+$34,000, 1FTE/1 Positions) – NOAA requests additional funding to utilize the National Coastal Resilience Fund (NCRF), in partnership with the National Fish and Wildlife Foundation (NFWF), to restore, increase and strengthen natural infrastructure to protect coastal communities while also enhancing habitats for fish and wildlife. This effort will result in an increased number of nature-based solutions to enhance the resilience of coastal communities and ecosystems, the creation of jobs related to implementing restoration projects, a better accounting of restoration benefits, more resilient habitats/ecosystems and communities, and coastal communities less at risk from flood damage. The additional funding will also enable NCRF to provide increased support for communities most vulnerable to climate impacts, including those who have historically been underserved and often lack access to resources. The NCRF expansion will include enhanced engagement and technical assistance to support applicants and grantees, including partnerships with organizations that address issues related to equity and justice and partnerships with the private sector where there exists mutual interest in building community resilience and avoiding future damages.

There is an increasing need for NOAA to create and foster natural and economic resilience along our coasts through support, expertise and robust, on-the-ground partnerships and place-based conservation activities. Ecological restoration and community resilience, as outlined in EO 14008, are integral to NOAA and the Administration's climate strategy.

Schedule and Milestones:
FY 2022 – FY 2026

- Expand cooperative agreement with NFWF to provide additional support for grants and technical assistance (FY 2022 - FY 2026)
- Expand NCRF competitive grants program and request for proposals to include more support for planning, site assessment, design, and implementation projects benefiting a diversity of communities (FY 2022)

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

- Partner with NFWF to expand and diversify the NCRF applicant pool and provide technical assistance to grantees (FY 2022 – FY 2026)
- Increase the number of communities pursuing natural and nature-based infrastructure to enhance ecosystem and community resilience, including those that are historically underserved (FY 2022 – FY 2026)

Deliverables:

- 90 communities per year pursuing nature-based approaches through this program (that number is based on an average of the deliverables listed below):
    - 30-35 resilience strategies or plans per year resulting from Capacity-Building and Planning projects
    - 15-20 site assessments and preliminary designs per year resulting from Preliminary Design projects
    - 15-20 final designs supported per year
    - 20-25 resilience Implementation projects supported per year

Performance Measures	2022	2023	2024	2025	2026
Number of communities pursuing nature-based approaches through this program					
With Increase	90	180	270	360	450
Without Increase	50	100	150	200	250
Outyear Costs:					
Direct Obligations	34,000	34,000	34,000	34,000	34,000
Capitalized	0	0	0	0	0
Uncapitalized	34,000	34,000	34,000	34,000	34,000
Budget Authority	34,000	34,000	34,000	34,000	34,000
Outlays	21,080	21,080	21,080	21,080	21,080
FTE	1	1	1	1	1
Positions	1	1	1	1	1

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Ocean and Coastal Management and Services
Subactivity: National Oceans and Coastal Security Fund
Program Change: Increasing Coastal Resilience Through Nature-Based Approaches

Title		Grade	Number	Annual Salary	Total Salaries
Program Analyst		ZA-3/4	1	150,000	150,000
Total			1		150,000
Less lapse	25.00%		(0)		(37,500)
Total full-time permanent (FTE)			1		112,500
2022 Pay Adjustment (2.7%)					3,038
					115,538

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	1
Total FTE	1
Authorized Positions:	
Full-time permanent	1
Total Positions	1

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Ocean and Coastal Management and Services
Subactivity: National Oceans and Coastal Security Fund

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	0	0	0	116	116
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	0	0	0	116	116
12	Civilian personnel benefits	0	0	0	44	44
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	1	0	0	0	0
22	Transportation of things	0	0	0	0	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	117	0	0	170	170
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	0	0	0	0	0
31	Equipment	0	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	82,487	34,000	34,000	67,670	33,670
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
77	Overhead	3	0	0	0	0
99	Total obligations	82,608	34,000	34,000	68,000	34,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Coral Reef Program	Pos./BA	25	33,193	26	43,193	1	10,000
	FTE/OBL	25	33,193	26	43,193	1	10,000

Reducing Climate Threats to Coral Reefs (+$10,000, 1 FTE/1 Positions) – NOAA requests additional funding to expand research and data collection on Stony Coral Tissue Loss Disease (SCTLD). Through CRCP's granting mechanism, NOAA will be able to give priority to projects that build capacity for disease detection, prevention and response efforts; engage with partners to promote awareness, through collaborations with coral reef managers and regional fisheries managers; and advance international partnerships to prevent spread to the Pacific. In order to ensure that grants are administered in a timely manner, and that the related environmental compliance work is appropriately addressed, NOAA will invest 0.1 percent of these resources to enhance its internal capacity. The remainder of the funds will go towards the grants that focus on the disease, the threat of climate change, coral reef restoration, and on priority coral reef regions and watersheds - both important to the climate resilience of coastal ecosystems.

The CRCP provides financial awards (grants and cooperative agreements) to support conservation projects focused on combating climate change impacts to coral resources, protecting critical reef structures that serve as shoreline barriers that help prevent loss of life and property damage, and conducting scientific studies that benefit coral reef management across seven U.S. states and territories, the Caribbean, and the Pacific. NOAA's grants are matched by nonprofit organizations, academic institutions, regional fishery management councils, commercial entities, community groups, and state and territorial natural resource management agencies.

There is an increasing need for NOAA to create and foster natural and economic resilience along our coasts through support, expertise and robust, on-the-ground partnerships and place-based conservation activities. Ecological restoration and community resilience, as outlined in EO 14008, are integral to NOAA and the Administration's climate strategy.

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Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022 – FY 2026

- Finish implementation plan for NOAA SCTLD Strategic Plan (FY 2022)
- Draft and publish RFP for new SCTLD Grant Program (FY 2022)
- Modify RFP for other relevant CRCP grants competitions to include greater funding for SCTLD (FY 2022)
- Recruit and hire new Federal program officer to manage new grants program including all environmental compliance requirements (FY 2022)
- Increase the number of projects to research SCTLD, train new people to detect and conduct interventions, and promote awareness to prevent the spread to the Pacific basin. (FY 2022 – FY 2026)

Deliverables:

- 10-20 funded projects per year improving understanding of SCTLD pathogen and transmission, as a result of funding competitions
- Three to five SCTLD domestic and international strategies or plans per year as a result of funding competitions
- Three to five site assessments and improved monitoring per year in areas where SCTLD exists or is likely to infect resources
- 150 people trained per year to detect and conduct interventions to combat SCTLD

Performance Measures	2022	2023	2024	2025	2026
Number of people trained to detect and treat SCTLD lesions (cumulative)					
With Increase	150	300	450	600	750
Without Increase	10	20	30	40	50
Outyear Costs:					
Direct Obligations	10,000	10,000	10,000	10,000	10,000
Capitalized	0	0	0	0	0
Uncapitalized	10,000	10,000	10,000	10,000	10,000

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Budget Authority	10,000	10,000	10,000	10,000	10,000
Outlays	6,200	6,200	6,200	6,200	6,200
FTE	1	1	1	1	1
Positions	1	1	1	1	1

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Ocean and Coastal Management and Services
Subactivity: Coral Reef Program
Program Change: Reducing Climate Threats to Coral Reefs

Title		Grade	Number	Annual Salary	Total Salaries
Program Analyst		ZA-03	1	113,000	113,000
Total			1		113,000
Less lapse	25.00%		(0)		(28,250)
Total full-time permanent (FTE)			1		84,750
2022 Pay Adjustment (2.7%)					2,288
					87,038

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	1
Total FTE	1
Authorized Positions:	
Full-time permanent	1
Total Positions	1

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Ocean and Coastal Management and Services
Subactivity: Coral Reef Program

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	2,190	1,491	1,611	1,698	87
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	18	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	2,208	1,491	1,611	1,698	87
12	Civilian personnel benefits	819	526	599	632	33
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	163	124	124	124	0
22	Transportation of things	8	0	0	0	0
23	Rent, communications, and utilitites	330	49	49	49	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	14	6	6	6	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	5,179	21,692	21,692	21,692	0
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	167	162	162	162	0
31	Equipment	169	52	52	52	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	18,265	8,898	8,898	18,778	9,880
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
77	Overhead	1,061	0	0	0	0
99	Total obligations	28,383	33,000	33,193	43,193	10,000

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Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
National Estuarine Research Reserve System	Pos./BA	0	28,500	0	42,500	0	14,000
	FTE/OBL	0	28,500	0	42,500	0	14,000

Place-based Resilience Training, Education, and Research (+$14,000, 0 FTE/0 Positions) – NOAA requests additional funding to provide resources for each of 29 National Estuarine Research Reserves to monitor climate change impacts on sensitive estuarine ecosystems nationwide and share potential management and adaptation approaches to address them, including research on the ecology and economics of coastal resilience adaptation measures. With these funds, NOAA will invest in research and monitoring to aid conservation and management efforts on local and national levels to plan for and adapt to climate change impacts to communities as well as preserve habitat migration corridors and the long-term integrity of reserves to serve their purpose in perpetuity. The increase will support training and technical assistance activities for local and state community officials to prepare for, mitigate, and adapt to climate impacts; stewardship activities that support habitat conservation, restoration, and decision support tools; and resilience-based community education that increases teacher's understanding of estuary science and how to engage their students in understanding of changes in their local environment using actual data from the reserves.

There is an increasing need for NOAA to create and foster natural and economic resilience along our coasts through support, expertise and robust, on-the-ground partnerships and place-based conservation activities. Ecological restoration and community resilience, as outlined in EO 14008, are integral to NOAA and the Administration's climate strategy.

Schedule and Milestones:
FY 2022 – FY 2026

- Expand the Teachers on the Estuary Program to serve more schools, teachers and students (FY 2022 - FY 2026)
- Expand the training and technical services to more coastal communities in the reserve watershed (FY 2022 - FY 2026)
- Conduct restoration, acquisition, and maintenance activities to conserve and protect coastal lands and waters (FY 2022 - FY 2026)
- Implement system-wide monitoring module(s) to assess impacts of climate change on coastal habitats (FY 2022 - FY 2026)

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(Dollar amounts in thousands)

- Complete reserve habitat maps and conduct habitat change analyses (FY 2023 - FY 2026)
- Conduct reserve vulnerability assessments in 10 reserves (FY 2023 - FY 2026)
- Use vulnerability assessment data and community data to build reserve resilience plans in eight reserves (FY 2023 - FY 2026)

Deliverables:

- 30 reserves implement the system-wide monitoring module to assess impacts of climate change on coastal habitats
- 30 reserve habitat maps completed and piloted for habitat change analyses
- 10 reserves complete vulnerability assessments
- Eight reserves complete resilience plans that build off the vulnerability assessment and community data
- 29 reserves enhance Teachers on the Estuary programs to serve more schools, teachers and students
- 29 reserves provide additional training and technical services to reserve-adjacent coastal communities

Performance Measures	2022	2023	2024	2025	2026
Number of reserves conducting habitat change analysis					
With Increase	5	10	15	25	30
Without Increase	0	0	0	0	0
Number of reserves conducting vulnerability assessments					
With Increase	2	4	6	8	10
Without Increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	14,000	14,000	14,000	14,000	14,000
Capitalized	0	0	0	0	0
Uncapitalized	14,000	14,000	14,000	14,000	14,000

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(Dollar amounts in thousands)

Budget Authority	14,000	14,000	14,000	14,000	14,000
Outlays	8,680	8,680	8,680	8,680	8,680
FTE	0	0	0	0	0
Positions	0	0	0	0	0

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Ocean and Coastal Management and Services
Subactivity: National Estuarine Research Reserve System

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	0	0	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	0	0	0	0	0
12	Civilian personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	0	0
22	Transportation of things	0	0	0	0	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	25	0	0	0	0
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	0	0	0	0	0
31	Equipment	0	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	27,540	28,500	28,500	42,500	14,000
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
77	Overhead	0	0	0	0	0
99	Total obligations	27,565	28,500	28,500	42,500	14,000

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Sanctuaries and Marine Protected Areas	Pos./BA	186	57,235	201	80,735	15	23,500
	FTE/OBL	177	57,235	188	80,735	11	23,500

Assessing Place-based Climate Vulnerability for Conservation Action (+$23,500, 11 FTE/15 Positions) – NOAA requests additional funding to engage partners, underrepresented communities, Tribes, indigenous, and native communities to invest in priorities within current and potential national marine sanctuaries. NOAA will also strengthen conservation in U.S. waters by increasing capacity for protection, conservation, and stewardship in existing and soon-to-be designated sanctuaries. NOAA will work through the designation process for the five additional sanctuaries currently on the inventory, as well as the Papahānaumokuākea Marine National Monument, for a total of six. ONMS will work to identify gaps in marine protection, and train the next generation of MPA professionals. NOAA will also conduct climate vulnerability assessments, and take action to promote climate resilience, and expand research initiatives to better understand the changing climate in these ecological and cultural resources.

With these funds, NOAA will expand conservation and protection across its sanctuary system through research, monitoring, restoration, permitting, community engagement, and interagency partnerships, all for informing locally-driven management decisions. NOAA will increase engagement with communities of color, underrepresented groups, and indigenous and native peoples, in conservation, planning, and outreach across the system. NOAA will also be able expand technology use in sanctuaries to support a myriad of management priorities, including conservation and research activities outlined above, and increased active restoration of natural habitats in national marine sanctuaries and marine national monuments. The vulnerability assessments that ensue will increase NOAA's understanding of the effects of climate change on these special places, including sensitivities of species and habitats to ecological changes, and the rate of change, to inform management strategies to promote resilience.

There is an increasing need for NOAA to create and foster natural and economic resilience along our coasts through support, expertise and robust, on-the-ground partnerships and place-based conservation activities. Ecological restoration and community resilience, as outlined in EO 14008, are integral to NOAA and the Administration's climate strategy.

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(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022 – FY 2026

- Increase capacity for conservation, education, Indigenous and Native communities coordination, acquisitions, designations, restoration and climate coordination (FY 2022)
- Develop strategies to prevent vessel sinkings and groundings in national marine sanctuaries and marine national monuments and sustainably fund removal of vessels and associated debris (FY 2022 - FY 2023)
- Increase dive capacity for restoration through volunteer training and contracting (FY 2022 – FY 2023)
- Conduct spatial analysis of gaps in marine protection
- Compete NEPA reviews, rulemaking, stakeholder engagement, and community meetings as part of designation process (FY 2022 – FY 2025)
- Create an MPA Academy for training future MPA leaders across Federal, state, and local governments focusing on increasing access to MPA careers by communities of color and underrepresented communities (FY 2022 – FY 2026)
- Provide grants or paid internships for underrepresented students to work with the Sanctuaries (FY 2022 – FY 2026)
- Provide ocean literacy grants to local schools (FY 2022 – FY 2026)
- Address site-specific, system-wide (i.e. infrastructure) and educational aspects of climate change impacts across the system (FY 2022 – FY 2026)
- Expand, plan, and test technology use in sanctuaries for enforcement, monitoring, research, disentanglement and other management priorities (FY 2022 – FY 2026)
- Increase direct restoration of key habitats and species across the system (FY 2022 – FY 2026)
- Create and implement an expanded system-wide business recognition program (FY 2023)
- Expand enforcement through agreements and new technology (FY 2023 – FY 2026)

Deliverables:

- Improved user compliance with regulations within sanctuary boundaries via education
- Deliver a cohort of trained MPA leaders across multiple levels of government that reflect the diversity of the communities they represent
- Native and indigenous community and climate needs are integrated into site management plans
- Develop improved, sustained engagement with tribes and indigenous peoples across the system
- Understand and address system-wide diversity of staff, advisory councils, and volunteers with a goal of broader inclusivity.
- All sites currently on inventory are designated
- GIS analysis of U.S. marine waters for various possible protections
- Increased testing and operation of innovative technology to meet system needs

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Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

- Establish and sustain a dedicated, centralized dive team supporting all sites

Performance Measures	2022	2023	2024	2025	2026
Percentage of ONMS Sanctuaries with new or updated climate vulnerability assessments					
With Increase	43%	44%	48%	55%	64%
Without Increase	35%	35%	35%	35%	35%
Number of formal partnerships or agreements with tribes, indigenous, and native communities					
With Increase	8	9	12	14	16
Without Increase	8	8	8	8	8
Outyear Costs:					
Direct Obligations	23,500	23,500	23,500	23,500	23,500
Capitalized	0	0	0	0	0
Uncapitalized	23,500	23,500	23,500	23,500	23,500
Budget Authority	23,500	23,500	23,500	23,500	23,500
Outlays	14,570	14,570	14,570	14,570	14,570
FTE	11	15	15	15	15
Positions	15	15	15	15	15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Ocean and Coastal Management and Services
Subactivity: Sanctuaries and Marine Protected Areas
Program Change: Assessing Place-based Climate Vulnerability for Conservation Action

Title		Grade	Number	Annual Salary	Total Salaries
Resource Protection Coordinator		ZA-03	1	113,000	113,000
Education Coordinator		ZA-03	1	113,000	113,000
Climate Coordinator		ZA-03	1	113,000	113,000
Superintendent		ZA-04	2	162,000	324,000
Maritime Heritage Coordinator		ZA-03	2	115,000	230,000
Education Coordinator		ZA-03	1	115,000	115,000
Program Operations Coordinator		ZA-03	1	115,000	115,000
Resource Protection Coordinator		ZA-03	1	101,000	101,000
Research Diver		ZA-02	2	77,000	154,000
Contracts and Grants Specialist		ZA-03	1	113,000	113,000
Indigenous and Native People Coordinator		ZA-04	1	172,000	172,000
Indigenous and Native People Coordinator		ZA-04	1	159,000	159,000
Total			15		1,822,000
Less lapse	25.00%		(4)		(455,500)
Total full-time permanent (FTE)			11		1,366,500
2022 Pay Adjustment (2.7%)					36,896
					1,403,396

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	11
Total FTE	11
Authorized Positions:	
Full-time permanent	15
Total Positions	15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Ocean and Coastal Management and Services
Subactivity: Sanctuaries and Marine Protected Areas

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	20,823	22,209	23,237	24,640	1,403
11.3	Other than full-time permanent	79	0	0	0	0
11.5	Other personnel compensation	397	585	587	587	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	21,299	22,794	23,824	25,227	1,403
12	Civilian personnel benefits	7,708	8,756	9,376	9,909	533
13	Benefits for former personnel	6	0	0	0	0
21	Travel and transportation of persons	582	176	176	326	150
22	Transportation of things	199	96	96	116	20
23	Rent, communications, and utilitites	3,223	3,229	3,237	4,087	850
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	72	77	77	77	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	10,661	13,681	13,712	28,506	14,794
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	639	1,007	1,009	1,759	750
31	Equipment	195	242	242	992	750
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	7,414	5,474	5,486	9,736	4,250
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
77	Overhead	3,462	0	0	0	0
99	Total obligations	55,460	55,532	57,235	80,735	23,500

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Sanctuaries and Marine Protected Areas	Pos./BA	186	57,235	186	59,235	0	2,000
	FTE/OBL	177	57,235	177	59,235	0	2,000

Fostering Ecological Resilience Through Conservation Action (+$2,000, 0 FTE/0 Positions) – This is one of three complimentary requests across NOS programs required to convert the increasing number of observations into implementable conservation actions, and ensure that coastal communities receive the full suite of scientific support from NOAA programs and interagency partners to inform local management decisions. The complementary requests detailing data observing systems and the co-development of data products can be found in the Navigation, Observations and Positioning (NOS-39) and Coastal Science and Assessment (NOS-82) sections.

Here, NOAA is requesting additional funding to ensure that ONMS can take into account the increased IOOS observations on a changing climate, biological resources, living resources and other environmental and human drivers, and incorporate them into sanctuary management plans. ONMS will leverage the expanded observations provided by IOOS with a large focus on biological and living resources such as corals, kelp, and reef fish.

Together, these three increases will ensure that the IOOS, National Centers for Coastal Ocean Science, and ONMS can work collaboratively so that the increase in number of observations, particularly those in newly expanded and designated sanctuary sites, such as those collected through the resilience grants in the Monitoring Ecological Change Through Observing Systems request (NOS-53), are met with a robust integrated process to successfully convert these into implementable conservation actions, and used to answer key management questions.

There is an increasing need for NOAA to create and foster natural and economic resilience along our coasts through support, expertise and robust, on-the-ground partnerships and place-based conservation activities. Ecological restoration and community resilience, as outlined in EO 14008, are integral to NOAA and the Administration's climate strategy.

Schedule and Milestones:

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

FY 2022 – FY 2026

- Develop a climate change sanctuary observation plan in collaboration with key internal partners (FY 2022)
- Integrate new IOOS observation data into condition reports (FY 2023 - FY 2026)
- Produce web-enabled condition reports for sites as condition report updates occur (FY 2023 - FY 2026)
- Expand acoustic monitoring program in all relevant sanctuaries (FY 2023 - FY 2026)

Deliverables:

- Increased ability to answer management questions in recently expanded and designated areas
- Increased ability to answer climate change and living resource based management questions across system

Performance Measures	2022	2023	2024	2025	2026
Total number of MPA/Sanctuary/Monument sites where biodiversity and habitat condition and assessments are automatically updated with IOOS Marine Life observations					
With Increase - total if all three complimentary requests are funded	3	6	9	12	14
With Increase - if only this request is funded	3	4	5	6	7
Without Increase	3	3	3	3	3
Sanctuary and monument reporting areas that can adequately assess resource condition					
With Increase	80%	80%	82%	84%	86%
Without Increase	80%	80%	80%	80%	80%

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Outyear Costs:					
Direct Obligations	2,000	2,000	2,000	2,000	2,000
Capitalized	0	0	0	0	0
Uncapitalized	2,000	2,000	2,000	2,000	2,000
Budget Authority	2,000	2,000	2,000	2,000	2,000
Outlays	1,240	1,240	1,240	1,240	1,240
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Ocean and Coastal Management and Services
Subactivity: Sanctuaries and Marine Protected Areas

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	20,823	22,209	23,237	23,237	0
11.3	Other than full-time permanent	79	0	0	0	0
11.5	Other personnel compensation	397	585	587	587	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	21,299	22,794	23,824	23,824	0
12	Civilian personnel benefits	7,708	8,756	9,376	9,376	0
13	Benefits for former personnel	6	0	0	0	0
21	Travel and transportation of persons	582	176	176	196	20
22	Transportation of things	199	96	96	96	0
23	Rent, communications, and utilitites	3,223	3,229	3,237	3,237	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	72	77	77	77	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	10,661	13,681	13,712	15,442	1,730
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	639	1,007	1,009	1,009	0
31	Equipment	195	242	242	292	50
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	7,414	5,474	5,486	5,686	200
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
77	Overhead	3,462	0	0	0	0
99	Total obligations	55,460	55,532	57,235	59,235	2,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Sanctuaries and Marine	Pos./BA	186	57,235	186	58,035	0	800
Protected Areas	FTE/OBL	177	57,235	177	58,035	0	800

Enterprise Infrastructure Solutions (EIS) (+$800, 0 FTE/0 Positions) – This increase will enable NOAA to conduct a technology modernization and support an accelerated transition of telecommunications services to the GSA EIS contract vehicle. DOC currently uses GSA's Networx, Washington Interagency Telecommunications System 3, and regional contracts to acquire telecommunication services. These contracts expire in May 2023. Between now and then, DOC will be transitioning telecommunications services to the GSA EIS follow-on contract. Additional EIS requests can also be found in Mission Support (MS-65), NOS (NOS-48, NOS-88, NOS-120), NMFS (NMFS-71), NWS (NWS-24, NWS-127, NWS-182), NESDIS (NESDIS-37), and OMAO (OMAO-19).

The modernization enables NOAA to re-architect its network infrastructure to gain efficiencies and resilience, realize significantly reduced costs for network services after transition, and minimize risk as legacy services are discontinued. Increased funding will accelerate the transition and enable NOAA to: (a) contract for engineering services to re-architect the network infrastructure and establish detailed transition plans; (b) issue awards for new hardware and telecommunication services; (c) trench and lay new lines, decommission and provision circuits; and (d) establish funding for administrative services to provide ordering, invoice processing, and inventory management. By expediting the technology modernization and migration to the new EIS vendors, NOAA will realize significant reductions in price and cost-avoidance. This funding will reduce risks related to service delivery and operations due to termination of GSA legacy service contracts.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022 - 2026

- Award NOAA task orders under EIS to support modernization needs
- Establish a sustainable, resilient architecture to meet NOAA's current and planned needs
- Transition 100% NOAA Legacy GSA inventory to EIS

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Deliverables:

- Modernized telecommunications infrastructure capable of meeting the agency's mission
- Provide a centralized ordering and management platform
- Provide a secure infrastructure resistant to extreme weather impacts

Performance Measures	2022	2023	2024	2025	2026
Transition of NOAA Telecommunication services to GSA's EIS*					
With Increase	35%	60%	80%	100%	0%
Without Increase	20%	45%	55%	65%	75%

*Assumes full funding of EIS initiatives NOAA-wide

Outyear Costs:					
Direct Obligations	800	800	800	800	800
Capitalized	0	0	0	0	0
Uncapitalized	800	800	800	800	800
Budget Authority	800	800	800	800	800
Outlays	800	800	800	800	800
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Ocean and Coastal Management and Services
Subactivity: Sanctuaries and Marine Protected Areas

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	20,823	22,209	23,237	23	0
11.3	Other than full-time permanent	79	0	0	0	0
11.5	Other personnel compensation	397	585	587	1	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	21,299	22,794	23,824	24	0
12	Civilian personnel benefits	7,708	8,756	9,376	9	0
13	Benefits for former personnel	6	0	0	0	0
21	Travel and transportation of persons	582	176	176	0	0
22	Transportation of things	199	96	96	0	0
23	Rent, communications, and utilitites	3,223	3,229	3,237	3	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	72	77	77	800	800
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	10,661	13,681	13,712	14	0
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	639	1,007	1,009	1	0
31	Equipment	195	242	242	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	7,414	5,474	5,486	5	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
77	Overhead	3,462	0	0	2,742	0
99	Total obligations	55,460	55,532	57,235	3,599	800

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
JUSTIFICATION OF PROGRAM AND PERFORMANCE

Activity: Construction

Goal Statement

The NOS Construction activity provides construction and acquisition support for the National Estuarine Research Reserve System (NERRS) and the National Marine Sanctuaries.

The National Estuarine Research Reserve System (NERRS) is a Federal-state partnership established under the Coastal Zone Management Act designed to protect and understand valuable estuarine resources through research and education. NOAA funds NERRS construction and land acquisition projects on a competitive basis. For PAC, NERRS funding has been matched 70:30 (Federal: state) for facilities construction and 1:1 for land acquisition. By providing funding to conduct land acquisition and construction projects that support the NERRS mission, NOAA will strengthen protection of key land and water areas, enhance long-term protection of Reserve areas for research and education, and provide for facility and exhibit construction that meet sustainable design standards.

NOS administers the Nation's system of 14 Marine Sanctuaries and two Marine National Monuments under the National Marine Sanctuaries Act. PAC funding supports capital costs of maintaining the Sanctuary Program's facilities and small boat fleet. Vessels for research, monitoring, enforcement and emergency response are essential to site management, especially in areas such as Florida Keys National Marine Sanctuary. Capital funding is critical to ensure these assets remain mission effective and to keep their life cycle costs under control.

Base Program

NERRs are state-owned lands and onsite facilities operated and managed by the states. They provide opportunities for researchers as well as the public to better understand these estuarine areas. Facilities investments at the reserves align with system-wide construction plans that consider requirements for implementing core NERRS programs and external opportunities for partnerships. Small scale construction projects are funded to enhance or sustain opportunities for public access and to increase public understanding of estuarine ecosystems. States also used these grants to acquire additional nearby critical habitat within, or adjacent to, reserve boundaries to increase protection, connect habitats to allow for species or habitat migration, maintain system diversity, and provide places for conducting long-term science, education, and demonstration programs.

The National Marine Sanctuary System's comprehensive facilities plan prioritizes capital investment in facilities, exhibits and collaborative education and visibility projects. In order to establish better understanding and appreciation for sanctuary and other ocean resources by the public, the program develops and maintains a network of exhibits, signage, and kiosks. Whenever possible NOAA develops cooperative centers at existing aquaria, museums and other appropriate facilities to engage the public and environmental decision-makers on

conservation issues. Capital requirements for sanctuary facilities include safety improvements, Americans with Disabilities Act upgrades, and capital maintenance.

NOS maintains and repairs a fleet of small boats to access protected areas for research, monitoring, outreach, and emergency support. Periodic assessments help to determine whether any refurbishments or upgrades are needed to maintain boat safety and legal compliance, mission effectiveness, or extend boats'' service life. Upgrades can include hull form modification, propulsion system revision and replacement, and upgrades of scientific, navigational, load handling, and auxiliary systems. NOS periodically performs large scale maintenance, refurbishments, replacements or upgrades to maintain fleet safety, longevity, and mission effectiveness.

Statement of Operating Objectives

Schedule and Milestones:

- Publish a Federal funding opportunity to solicit proposals for construction and land acquisition projects (e.g., visitor center and laboratories, dormitories, green upgrades, public access, and critical habitats) across the NERRS
- Coordinate review and scoring of proposals to inform selections, and provide final recommendations to NOAA's Grants Management Division
- Finalize selection of approximately 10-13 projects and distribute funds to successful applicants
- Conduct critical capital construction and acquisition activities for the sanctuary fleet, as well as emergency and required major small boat repairs (ongoing)
- Conduct construction of exhibits and signage across sanctuary system, including with partners
- Conduct major construction and repair activities for owned and leased facilities across the system

Deliverables:

- Construction of NERRS projects and facilities enhancements selected in FY 2021
- Advance construction of ongoing projects at one of four sites: Kihei, HI, Hawaiian Island Humpback Whale Marine Sanctuary; Key West, FL, Florida Keys National Marine Sanctuary; Galveston, TX, Flower Gardens Banks National Marine Sanctuary; or Scituate, MA, Stellwagen Bank National Marine Sanctuary
- Complete construction of exhibits and signage

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
JUSTIFICATION OF PROGRAM AND PERFORMANCE

Explanation and Justification

Line Item		2020 Actual Personnel	2020 Actual Amount	2021 Enacted Personnel	2021 Enacted Amount	2022 Base Personnel	2022 Base Amount
National Estuarine Research Reserve Construction	Pos/BA	1	4,467	0	4,500	0	4,500
	FTE/OBL	1	4,667	0	4,500	0	4,500
Marine Sanctuaries Construction	Pos/BA	2	2,961	1	4,000	1	4,000
	FTE/OBL	2	4,144	1	4,000	1	4,000
Other NOS Construction	Pos/BA	0	0	0	0	0	0
	FTE/OBL	0	2	0	0	0	0
Total Construction	Pos/BA	3	7,428	1	8,500	1	8,500
	FTE/OBL	3	8,813	1	8,500	1	8,500

National Estuarine Research Reserve Construction
NERRSs are state-owned lands and onsite facilities operated and managed by the states. They provide opportunities for researchers as well as the public to better understand these estuarine areas. Facilities investments at the reserves aligned with system-wide construction plans that consider requirements for implementing core NERRS programs and external opportunities for partnerships. States also used these grants to acquire additional nearby critical habitat within, or adjacent to, reserve boundaries to increase protection and provide places for conducting long-term science, education, and demonstration programs.

Marine Sanctuaries Construction
Boats for research, monitoring, and emergency response are essential to site management, especially in areas such as the Florida Keys National Marine Sanctuary. NOS maintains and repairs a fleet of small boats to access protected areas for research, monitoring, outreach, and emergency support. Periodic assessments help to determine whether any refurbishments or upgrades are needed to maintain boat safety and legal compliance, mission effectiveness, or extend boats'' service life. Upgrades can include hull form modification, propulsion system revision and replacement, and upgrades of scientific, navigational, load handling, and auxiliary systems. NOS periodically performs large scale maintenance, refurbishments, or upgrades to maintain craft safety, mission effectiveness, or to extend a boat's service life.

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
JUSTIFICATION OF PROGRAM AND PERFORMANCE

In order to establish better understanding and appreciation for sanctuary and other ocean resources by the public, NOAA develops and maintains a network of exhibits and signage. Whenever possible, NOAA develops content and exhibits as cooperative centers at existing aquaria, museums and other appropriate facilities to engage the public and environmental decision makers on conservation issues. In FY 2020, NOAA opened the Kauai Ocean Discovery facility in partnership with the National Marine Sanctuary Foundation and Kukui Grove Shopping Center. This is the only admission-free, marine-oriented environmental education facility on Kaua`i, and is expected to increase the sanctuary's outreach and impact on the island by supporting tourism and expanding volunteer programs and partnerships with other agencies and institutions.

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Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Damage Assessment and Restoration Revolving Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
2021 Enacted	30	30	5,855	300,000
2022 Adjustments to base:				
less: Obligations from prior year balances	0	0	0	0
plus: Technical ATBs	0	0	145	(241,538)
2022 Base	30	30	6,000	48,462
plus: program changes	0	0	0	0
2022 Estimate	30	30	6,000	48,462

		2020 Actuals		2021 Enacted		2022 Base		2022 Estimate		Increase/ Decrease	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Damage Assessment and Restoration Revolving Fund	Pos/BA	30	3,351	30	5,855	30	6,000	30	6,000	0	0
	FTE/OBL	36	36,284	30	300,000	30	48,462	30	48,462	0	0
Total: Damage Assessment and Restoration Revolving Fund	Pos/BA	30	3,351	30	5,855	30	6,000	30	6,000	0	0
	FTE/OBL	30	36,284	30	300,000	30	48,462	30	48,462	0	0

Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Damage Assessment and Restoration Revolving Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	2020 Actuals		2021 Enacted		2022 Base		2022 Estimate		Increase/ Decrease	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Mandatory Obligation	30	36,284	30	300,000	30	48,462	30	48,462	0	0
Total Obligations	30	36,284	30	300,000	30	48,462	30	48,462	0	0
Adjustments to Obligations:										
Federal funds	0	0	0	0	0	0	0	0	0	0
Offsetting collections, mandatory	0	(11,602)	0	(65,000)	0	(10,000)	0	(10,000)	0	0
Change in uncollected payments, Fed	0	0	0	0	0	0	0	0	0	0
Recoveries	0	(1,323)	0	(20,000)	0	(20,000)	0	(20,000)	0	0
Unobligated balance, adj. SOY	0	(136,988)	0	(165,154)	0	(156,310)	0	(156,310)	0	0
Unobligated balance transferred (from DOI)	0	(48,210)	0	(200,000)	0	(50,000)	0	(50,000)	0	0
Unobligated balance, transferred (to ORF)	0	0	0	0	0	0	0	0	0	0
Unobligated balance, unapportioned	0	0	0	0	0	0	0	0	0	0
Unobligated balance, EOY	0	165,155	0	156,310	0	193,848	0	193,848	0	0
Total Budget Authority	30	3,315	30	5,855	30	6,000	30	6,000	0	0
Financing from Transfers:										
Appropriation (previously unavailable)	0	(207)	0	(197)	0	(342)	0	(342)	0	0
Transfer from DOI – CY	0	(6,641)	0	(6,000)	0	(6,000)	0	(6,000)	0	0
Appropriation temporarily reduced	0	197	0	342	0	342	0	342	0	0
Net Appropriation	30	0	30	0	30	0	30	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Damage Assessment and Restoration Revolving Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE

Activity: Damage Assessment and Restoration Revolving Fund

Goal Statement

The Damage Assessment and Restoration Revolving Fund facilitates the spill response, damage assessment, and natural resource restoration activities of the National Oceanic and Atmospheric Administration.

Base Program

A National Oceanic and Atmospheric Administration (NOAA) Damage Assessment and Restoration Revolving Fund was established under Section 1012(a) of the Oil Pollution Act for the deposit of sums provided by any party or governmental entity for response to discharges of oil or releases of hazardous substances, for assessment of damages to NOAA trust resources resulting from those discharges and releases, and for the restoration of the injured natural resources.

Through the Revolving Fund, NOAA does the following:

- Retains funds that are recovered through settlement or awarded by a court for restoration of injured natural resources and retains reasonable costs of conducting spill response and damage assessments that are recovered by NOAA through negotiated settlement, court award, or other reimbursement.
- Ensures funds deposited shall remain available to the trustee, without further appropriation, until expended to pay costs associated with response, damage assessment, and restoration of natural resources.

The NOAA Damage Assessment and Restoration Revolving Fund facilitates and sustains: (1) natural resource damage assessment while the Departments of Commerce and Justice seek full reimbursement from potentially responsible parties; and (2) restoration, replacement, or acquisition of the equivalent of injured or lost natural resources, including resources of National Marine Sanctuaries and National Estuarine Research Reserves, tidal wetlands and other habitats, for which NOAA is trustee. These program functions are conducted jointly within NOAA by the Office of General Counsel, NOS, and NMFS.

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Damage Assessment and Restoration Revolving Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease
11.1	Full-time permanent	4,430	3,729	3,829	3,829	0
11.3	Other than full time permanent	3	3	3	3	0
11.5	Other personnel compensation	51	52	53	53	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	**Total personnel compensation**	4,483	3,783	3,885	3,885	0
12.1	Civilian personnel benefits	1,572	1,500	1,541	1,541	0
12.2	Military personnel benefits	0	0	0	0	0
21	Travel and transportation of persons	261	264	267	267	0
22	Transportation of things	15	15	16	16	0
23.1	Rental payments to GSA	35	35	35	35	0
23.2	Rental payments to others	1	1	1	1	0
23.3	Comm., util., misc. charges	38	38	39	39	0
24	Printing and reproduction	3	3	3	3	0
25.1	Advisory and assistance services	1,335	1,000	1,010	1,010	0
25.2	Other services	14,495	49,837	14,140	14,140	0
25.3	Other purchases of goods and services from gov't accounts	904	200	200	200	0
26	Supplies and materials	216	218	221	221	0
31	Equipment	98	99	100	100	0
41	Grants, subsidies and contributions	12,821	243,000	27,000	27,000	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	6	6	6	6	0
44	Refunds	0	0	0	0	0
99.9	**Total Obligations**	36,284	300,000	48,432	48,432	0

Department of Commerce
National Oceanic and Atmospheric Administration
Damage Assessment and Restoration Revolving Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	2020 Actuals	2021 Enacted	2022 Base Program	2022 Estimate	Increase/ Decrease
Federal Funds	0	0	0	0	0
Offsetting Collections Mandatory	(11,602)	(65,300)	(10,000)	(10,000)	0
Recoveries	(1,323)	(20,000)	(20,000)	(20,000)	0
Change in uncollected payments, Fed	0	0	0	0	
Less unobligated balance, SOY	(136,988)	(165,155)	(156,310)	(156,310)	0
Plus unobligated balance transferred	(48,210)	(200,000)	(50,000)	(50,000)	0
Plus unobligated balance, EOY	165,155	156,310	193,848	193,848	0
Total Budget Authority	3,351	5,855	6,000	6,000	0
Transfers:					
Appropriation previously unavailable	(207)	(197)	(342)	(342)	
Transfer from DOI	(3,341)	(6,000)	(6,000)	(6,000)	0
Appropriation temporarily reduced	197	342	342	342	0
Net Appropriation	0	0	0	0	0
Personnel Data					
Full-Time equivalent Employment:					
Full-time permanent	30	30	30	30	0
Other than full time permanent	0	0	0	0	0
Total	30	30	30	30	0
Authorized Positions:					
Full-time permanent	30	30	30	30	0
Other than full time permanent	0	0	0	0	0
Total	30	30	30	30	0

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DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Sanctuaries Enforcement Asset Forfeiture Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
2021 Enacted	0	0	114	120
2022 Adjustments to base:				
less: Obligations from prior year balances	0	0	0	0
plus: Technical ATBs	0	0	6	0
2022 Base	0	0	120	120
plus: program changes	0	0	0	0
2022 Estimate	0	0	120	120

		2020 Actuals		2021 Enacted		2022 Base Program		2022 Estimate		Increase/ Decrease	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Sanctuaries Enforcement Asset Forfeiture Fund	Pos/BA	0	18	0	114	0	120	0	120	0	0
	FTE/OBL	0	25	0	120	0	120	0	120	0	0
Total: Sanctuaries Enforcement Asset Forfeiture Fund	Pos/BA	0	18	0	114	0	120	0	120	0	0
	FTE/OBL	0	25	0	120	0	120	0	120	0	0

DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Sanctuaries Enforcement Asset Forfeiture Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	2020 Actuals		2021 Enacted		2022 Base Program		2022 Estimate		Increase/ Decrease	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Mandatory Obligation	0	25	0	120	0	120	0	120	0	0
Total Obligations	0	25	0	120	0	120	0	120	0	0
Adjustments to Obligations:										
New offsetting collections	0	(10)	0	0	0	0	0	0	0	0
Recoveries	0	(6)	0	0	0	0	0	0	0	0
Unobligated balance, SOY	0	(234)	0	(243)	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	0	0	0	0	0	0	0	0	0
Unobligated balance, transferred	0	0	0	0	0	0	0	0	0	0
Unobligated balance, EOY	0	243	0	238	0	0	0	0	0	0
Unobligated balance, unapportioned	0	0	0	0	0	0	0	0	0	0
Total Budget Authority	0	18	0	114	0	120	0	120	0	0
Financing from Transfers:										
Appropriation previously unavailable	0	0	0	0	0	0	0	0	0	0
Appropriation temporarily reduced	0	1	0	7	0	0	0	0	0	0
Net Appropriation	0	19	0	120	0	120	0	120	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Sanctuaries Enforcement Asset Forfeiture Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE

Activity: Sanctuaries Enforcement Asset Forfeiture Fund

Goal Statement

The Sanctuaries Enforcement Asset Forfeiture Fund receives proceeds from civil penalties and forfeiture claims against responsible parties, as determined through court settlements or agreements, for violations of NOAA sanctuary regulations.

Base Program

Penalties received are held in sanctuary site-specific accounts from year to year, as the funds are spent on resource protection within the sanctuary site where the penalty or forfeiture occurred. Funds are expended for resource protection purposes which may include all aspects of law enforcement (from equipment to labor), community oriented policing programs, and other resource protection and management measures such as the installation of mooring buoys or restoration of injured resources.

Exhibit 16

DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Sanctuaries Enforcement Asset Forfeiture Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease
11.1	Full-time permanent	0	0	0	0	0
11.3	Other than full time permanent	0	0	0	0	0
11.2	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	**Total personnel compensation**	0	0	0	0	0
12.1	Civilian personnel Benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	0	0
22	Transportation of things	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental payments to others	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	11	0	0	0	0
25.2	Other services	13	120	120	120	0
25.3	Purchases of goods and services from Gov't accounts	0	0	0	0	0
26	Supplies and materials	0	0	0	0	0
31	Equipment	0	0	0	0	0
41	Grants, subsidies and contributions	0	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
99.9	**Total Obligations**	25	120	120	120	0

DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Sanctuaries Enforcement Asset Forfeiture Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease
Less recoveries	(6)	0	0	0	0
Less unobligated balance, SOY	(234)	(243)	0	0	0
Less unobligated balance, adj SOY	0	0	0	0	0
New offsetting collections	(10)	0	0	0	0
Plus unobligated balance, EOY	243	238	0	0	0
Plus unobligated balance, transferred	0	0	0	0	0
Total Budget Authority	18	114	120	120	0
Transfers:					
Appropriation previously unavailable	0	(1)	(7)	(7)	0
Appropriation temporarily reduced	1	7	7	7	0
Mandatory Appropriation	19	120	120	120	0

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DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Gulf Coast Ecosystem Restoration Science, Observation, Monitoring and Technology Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
2021 Enacted	2	2	0	7,798
2022 Adjustments to base:				
less: Obligations from prior year balances	0	0	0	0
less: Technical ATBs	0	0	0	(1,698)
2022 Base	2	2	0	6,100
plus: program changes	0	0	0	0
2022 Estimate	2	2	0	6,100

		2020 Actuals		2021 Enacted		2022 Base Program		2022 Estimate		Increase/ (Decrease)	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Gulf Coast Restoration Fund	Pos/BA	1	0	2	0	2	0	2	0	0	0
	FTE/OBL	2	4,968	2	7,798	2	6,100	2	6,100	0	0
Total: Gulf Coast Restoration Fund	Pos/BA	1	0	2	0	2	0	2	0	0	0
	FTE/OBL	2	4,968	2	7,798	2	6,100	2	6,100	0	0

Exhibit 5

DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Gulf Coast Ecosystem Restoration Science, Observation, Monitoring and Technology Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	2020 Actuals		2021 Enacted		2022 Base Program		2022 Estimate		Increase/ Decrease	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Mandatory Obligation	1	4,968	2	7,798	2	6,100	2	6,100	0	0
Total Obligations	1	4,968	2	7,798	2	6,100	2	6,100	0	0
Adjustments to Obligations:										
New offsetting collections	0	(5,645)	0	(6,027)	0	(6,100)	0	(6,100)	0	0
Change in Uncollected Payments	0	0	0	0	0	0	0	0	0	0
Recoveries	0	(17)	0	(150)	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	(928)	0	(1,621)	0	0	0	0	0	0
Unobligated balance, EOY	0	0	0	0	0	0	0	0	0	0
Total Budget Authority	1	0	2	0	2	0	2	0	0	0
Financing from Transfers:										
Transfer from Other Accounts	0	0	0	0	0	0	0	0	0	0
Appropriation temporarily reduced	0	0	0	0	0	0	0	0	0	0
Net Appropriation	1	0	2	0	2	0	2	0	0	0

DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Gulf Coast Ecosystem Restoration Science, Observation, Monitoring and Technology Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE

Activity: Gulf Coast Ecosystem Restoration Science, Observation, Monitoring and Technology Fund

Goal Statement

The Gulf Coast Ecosystem Restoration Science, Observation, Monitoring and Technology Fund provides funding for the NOAA RESTORE Act Science Program. The purpose of this program is to initiate and sustain an integrative, holistic understanding of the Gulf of Mexico ecosystem and support, to the maximum extent practicable, restoration efforts and the long-term sustainability of the ecosystem, including its fish stocks, fishing industries, habitat, and wildlife through ecosystem research, observation, monitoring, and technology development.

Base Program

To ensure the best use of resources the Program will coordinate with existing Federal and state science and technology programs, including other activities funded under the RESTORE Act. Section 1604 of the RESTORE Act authorized funding for the Program using 2.5 percent of the Gulf Coast Restoration Trust Fund.

Exhibit 16

DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Gulf Coast Ecosystem Restoration Science, Observation, Monitoring and Technology Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actuals	2021 Enacted	2022 Base Program	2022 Estimate	Increase/ Decrease
11.1	Full-time permanent	288	291	299	299	0
11.3	Other than full time permanent	0	0	0	0	0
11.2	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	**Total personnel compensation**	288	291	299	299	0
12.1	Civilian personnel Benefits	97	97	97	97	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	17	17	17	17	0
22	Transportation of things	2	2	2	2	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental payments to others	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	100	100	100	100	0
25.2	Other services	19	19	19	19	0
25.3	Other purchases of goods and services from Gov't accounts	505	0	0	0	0
26	Supplies and materials	30	30	30	30	0
31	Equipment	16	16	16	16	0
41	Grants, subsidies and contributions	3,894	7,227	5,521	5,521	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
99.9	**Total Obligations**	4,968	7,798	6,100	6,100	0

DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Gulf Coast Ecosystem Restoration Science, Observation, Monitoring and Technology Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	2020 Actuals	2021 Enacted	2022 Base Program	2022 Estimate	Increase/ Decrease
Federal Funds	0	0	0	0	0
Less offsetting collections	(5,645)	(6,027)	(6,100)	(6,100)	0
Change in uncollected payments	0	0	0	0	0
Recoveries	(17)	(150)	0	0	0
Less unobligated balance, SOY	(928)	(1,621)	0	0	0
Plus unobligated balance, EOY	0	0	0	0	0
Plus unobligated balance transferred	0	0	0	0	0
Total Budget Authority	0	0	0	0	0
Transfers:					
Transfers from Other Accounts	0	0	0	0	0
Appropriation temporarily reduced	0	0	0	0	0
Mandatory Budget Authority	0	0	0	0	0

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Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Budget Estimates, Fiscal Year 2022

Executive Summary

For FY 2022, NOAA requests a total of $1,197,458 and 2,793 FTE/ 3,293 positions for the National Marine Fisheries Service, including a net increase of $114,009,000 and 102 FTE/ 134 positions in program changes.

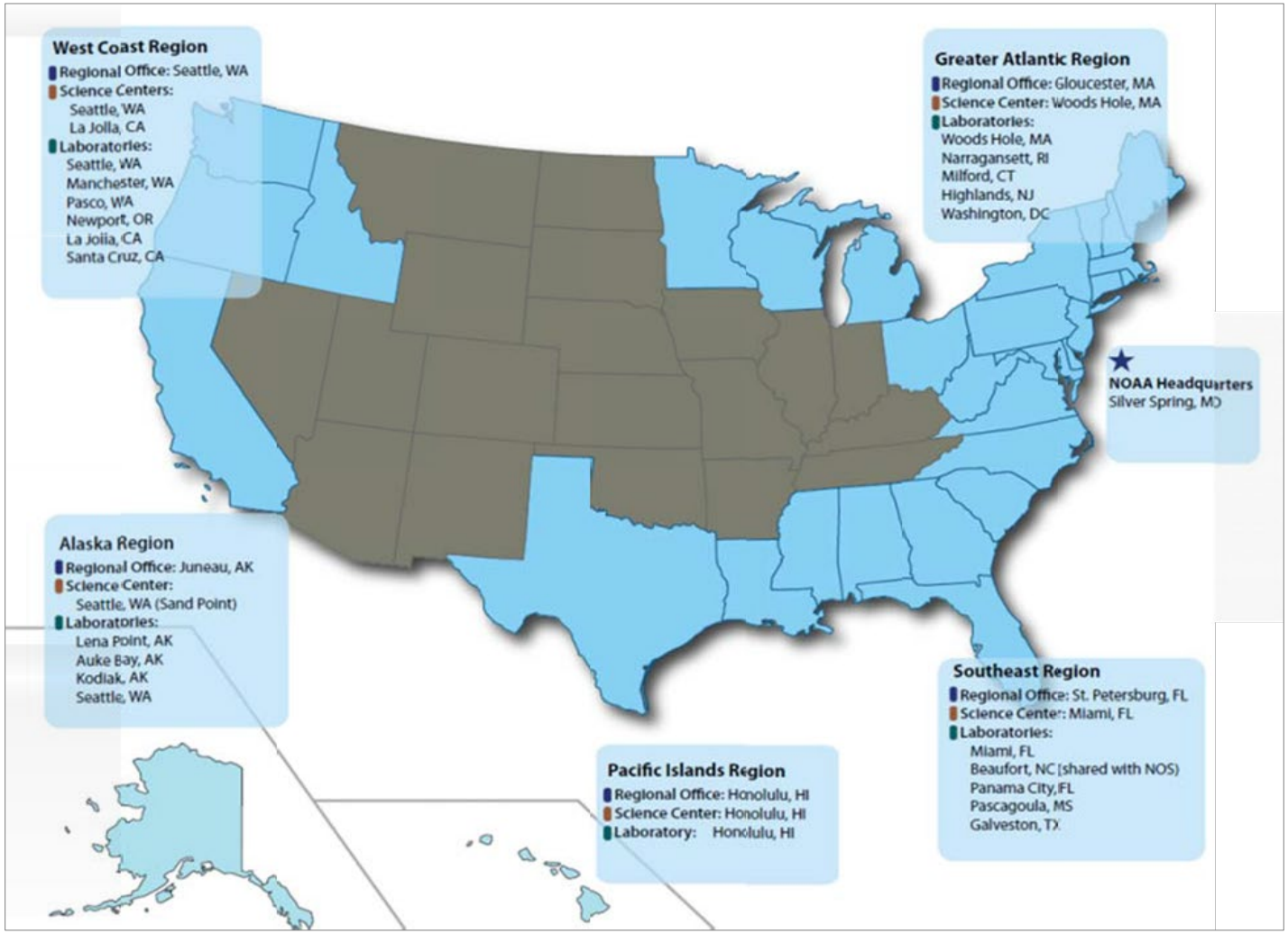
NOAA's National Marine Fisheries Service (NMFS) is responsible for the management and conservation of living marine resources within the U.S. Exclusive Economic Zone (EEZ) – the area extending from three to 200 nautical miles offshore. NMFS provides critical support to commercial and recreational marine fisheries and aquaculture industries, which generate $212 billion in sales impact, and support over 1.7 million jobs economy-wide.[1] NMFS also provides scientific and policy leadership in the international arena, and plays a key role in the management of living marine resources in coastal areas under state jurisdiction.

NMFS implements science-based conservation and management actions aimed at sustaining long-term use and promoting the health of coastal and marine ecosystems for the Nation's benefit. Programmatic authority for fisheries management, species protection, and habitat conservation activities is derived primarily from the Magnuson-Stevens Fishery Conservation and Management Act (MSA), Marine Mammal Protection Act (MMPA), and Endangered Species Act (ESA). Other acts provide additional authority for enforcement, seafood safety, habitat restoration, and cooperative efforts with states, Tribes, interstate fishery commissions, and other countries. All of these activities rely on strong scientific and research capabilities to support the challenging public policy decision process associated with NMFS' stewardship responsibilities.

NMFS consists of Headquarters offices in Silver Spring, MD and five Regional Offices as well as six Science Centers in significant coastal areas around the country. Major NMFS facilities and laboratories are located at the following sites:

[1] National Marine Fisheries Service. 2018. Fisheries Economics of the United States, 2016. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-F/SPO-187. Available at: https://www.fisheries.noaa.gov/resource/document/fisheries-economics-united-states-report-2016

Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Budget Estimates, Fiscal Year 2022



Department of Commerce
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National Marine Fisheries Service
Budget Estimates, Fiscal Year 2022

Significant Adjustments:

Inflationary Adjustments
NOAA's FY 2022 Base includes an increase of $31,895,000 and 0 FTE/ 0 positions to account for the full funding requirement for certain inflationary adjustments to current programs for NMFS activities. This includes the estimated 2022 civilian pay raise of 2.7 percent and the estimated 2022 military pay raise of 2.7 percent as well as inflationary increases for labor and non-labor activities, including benefits, and rent charges from the General Services Administration (GSA).

Technical Adjustments
NOAA requests the following transfers for a net change of $0 and 0 FTE/ 0 positions to the agency:

From Office	Subactivity	To Office	Subactivity	Amount
NMFS	Fisheries Data Collections, Surveys, and Assessments (ORF)	OMAO	NOAA Commissioned Officer Corps (ORF)	$1,562,000 / 13 FTE/ 13 positons

NOAA requests a transfer of $1,562,000 and 13 FTE/13 positions from the NMFS Fisheries Data Collections, Surveys, and Assessments PPA to the OMAO NOAA Commissioned Officer Corps PPA to allow for better alignment of funding and greater transparency over the full cost of the NOAA Corps. With this transfer, funding for all NOAA Corps personnel will reside within OMAO. This increases efficiency within the program by reducing administrative burdens and allows NOAA to better manage personnel requirements consistent with the NOAA Corps Amendments Act of 2020.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
TRANSFER CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Fisheries Science and Management
Subactivity: Fisheries Data Collections, Surveys and Assessments (ORF) - Transfer to NOAA Commissioned Officer Corps PPA (ORF)

	Object Class	2021 Enacted	2022 Transfer	2022 Base*
11.1	Full-time permanent compensation	46,780	0	50,275
11.3	Other than full-time permanent	436	0	468
11.5	Other personnel compensation	802	0	861
11.7	Military Personnel	1,520	(1,562)	0
11.9	Total personnel compensation	49,538	(1,562)	51,604
12	Civilian personnel benefits	17,366	0	18,638
13	Benefits for former personnel	5	0	5
21	Travel and transportation of persons	970	0	970
22	Transportation of things	355	0	355
23	Rent, communications, and utilitites	0	0	0
23.1	Rental payments to GSA	2,866	0	2,866
23.2	Rental Payments to others	235	0	235
23.3	Communications, utilities and misc charges	3,818	0	3,818
24	Printing and reproduction	158	0	158
25.1	Advisory and assistance services	13,959	0	13,959
25.2	Other services from non-Federal sources	18,053	0	18,053
25.3	Other goods and services from Federal sources	458	0	458
25.4	Operation and maintenance of facilities	0	0	0
25.5	Research and development contracts	0	0	0
25.6	Medical care	0	0	0
25.7	Operation and maintenance of equipment	0	0	0
25.8	Subsistence and support of persons	0	0	0
26	Supplies and materials	4,158	0	4,158
31	Equipment	1,822	0	1,822
32	Lands and structures	0	0	0
33	Investments and loans	0	0	0
41	Grants, subsidies and contributions	60,495	0	60,495
42	Insurance claims and indemnities	0	0	0
43	Interest and dividends	5	0	5
44	Refunds	0	0	0
99	Total obligations	174,261	(1,562)	177,599

*The 2022 Base column reflects the full 2022 base for the subactivity, including calculated ATBs and any additional transfers.

Department of Commerce
National Oceanic and Atmospheric Administration
PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS
(Dollar amounts in thousands)

		2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
NATIONAL MARINE FISHERIES SERVICE (NMFS)											
Protected Resources Science and Management	Pos/BA	783	199,644	853	203,506	853	211,772	889	237,127	36	25,355
	FTE/OBL	713	197,217	714	203,506	714	211,772	741	237,127	27	25,355
Fisheries Science and Management	Pos/BA	1,674	617,828	1,835	620,148	1,822	637,405	1,920	684,765	98	47,360
	FTE/OBL	1,553	635,575	1,568	620,148	1,555	637,405	1,630	684,765	75	47,360
Enforcement	Pos/BA	232	77,670	257	74,278	257	77,009	257	77,731	0	722
	FTE/OBL	213	81,924	214	74,278	214	77,009	214	77,731	0	722
Habitat Conservation & Restoration	Pos/BA	172	56,637	185	57,053	185	59,132	185	99,704	0	40,572
	FTE/OBL	177	57,320	179	57,053	179	59,132	179	99,704	0	40,572
TOTAL NMFS - ORF	**Pos/BA**	**2,861**	**951,779**	**3,130**	**954,985**	**3,117**	**985,318**	**3,251**	**1,099,327**	**134**	**114,009**
	FTE/OBL	**2,656**	**972,036**	**2,675**	**954,985**	**2,662**	**985,318**	**2,764**	**1,099,327**	**102**	**114,009**
TOTAL NMFS - PAC	**Pos/BA**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	FTE/OBL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Pacific Coastal Salmon Recovery Fund	Pos/BA	1	64,935	2	65,000	2	65,000	2	65,000	0	0
	FTE/OBL	2	64,935	2	65,000	2	65,000	2	65,000	0	0
Fisheries Disaster Assistance Fund	Pos/BA	0	299,700	0	300,000	0	0	0	0	0	0
	FTE/OBL	0	329,919	0	300,000	0	0	0	0	0	0
Fishermen's Contingency Fund	Pos/BA	0	6	0	349	0	349	0	349	0	0
	FTE/OBL	0	144	0	349	0	349	0	349	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS
(Dollar amounts in thousands)

		2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Foreign Fishing Observer Fund	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
Fisheries Finance Program Account	Pos/BA	0	12,790	0	3,564	0	0	0	0	0	0
	FTE/OBL	0	12,790	0	3,564	0	0	0	0	0	0
Federal Ship Financing	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
Promote and Develop Fisheries Products	Pos/BA	0	8,009	0	12,000	0	7,989	0	7,989	0	0
	FTE/OBL	0	8,485	0	12,684	0	7,989	0	7,989	0	0
Environmental Improvement and Restoration Fund	Pos/BA	0	6,676	0	6,289	0	2,908	0	2,908	0	0
	FTE/OBL	0	6,676	0	6,290	0	2,908	0	2,908	0	0
Limited Access System Administration Fund	Pos/BA	27	13,443	40	13,477	40	13,679	40	13,679	0	0
	FTE/OBL	27	15,528	27	14,999	27	14,553	27	14,553	0	0
Marine Mammal Unusual Mortality Event Fund	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
Western Pacific Sustainable Fisheries Fund	Pos/BA	0	384	0	493	0	595	0	595	0	0
	FTE/OBL	0	509	0	493	0	595	0	595	0	0
Fisheries Enforcement Asset Forfeiture Fund	Pos/BA	0	(3,004)	0	3,594	0	3,696	0	3,696	0	0
	FTE/OBL	0	3,408	0	7,532	0	8,200	0	8,200	0	0
	Pos/BA	0	2,935	0	2,528	0	3,915	0	3,915	0	0
North Pacific Observer Fund	FTE/OBL	0	5,091	0	3,251	0	3,915	0	3,915	0	0
TOTAL NMFS	**Pos/BA**	**2,889**	**1,357,653**	**3,172**	**1,362,279**	**3,159**	**1,083,449**	**3,293**	**1,197,458**	**134**	**114,009**
	FTE/OBL	**2,685**	**1,419,521**	**2,704**	**1,369,147**	**2,691**	**1,088,827**	**2,793**	**1,202,836**	**102**	**114,009**

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Protected Resources Science and Management

Goal Statement

The mission of the Protected Resources Science and Management activity is to assess, understand, and protect the health of protected species, the ecosystems that sustain them, and the communities that value and depend on them.

Base Program

NMFS, in partnership with internal and external stakeholders, uses best available science to develop and implement best practices and conservation actions to reduce threats to protected species and their marine and coastal ecosystems. Protected species include those listed under the Endangered Species Act (ESA) and marine mammals covered by the Marine Mammal Protection Act (MMPA). NMFS Programs funded within this activity operate under the legislative authority of the ESA and MMPA. NMFS implements the ESA and MMPA with the U.S. Fish and Wildlife Service (USFWS). In general, USFWS is responsible for the conservation of terrestrial and freshwater aquatic organisms, some marine mammals, and marine turtles on their nesting beaches. NMFS is responsible for the conservation of most marine mammals, most marine and anadromous fish (i.e., fish that migrate from the sea to freshwater to spawn), marine turtles at sea, marine invertebrates (including corals), and marine plants. In addition, the Marine Mammal Commission provides oversight and makes recommendations to NMFS on priority marine mammal issues, and three regional Scientific Review Groups provide independent review of our marine mammal stock assessments

Statement of Operating Objectives

Schedule and Milestones:
FY 2022 – FY 2026:

- Review listing petitions and issue 90-day findings, conduct ESA status reviews and issue 12-month findings, and promulgate ESA protective regulations
- Prepare recovery plans and implement recovery actions identified in the plans to improve the status of ESA-listed species
- Designate critical habitat
- Provide technical assistance, consultation, and authorization services for all Federal agencies' proposed actions (ESA Section 7)

- Work with Take Reduction Teams (TRTs) to achieve MMPA goals through increased compliance monitoring and bycatch assessments
- Evaluate effectiveness and recommend enforcement measures, modify existing regulations, and add protective measures to reduce marine mammal bycatch in fisheries
- Research the effects of human activities on the conservation and recovery of protected species
- Analyze protected species survey data to determine population trends
- Solicit proposals and award Species Recovery Grants to states and Tribes for conservation and recovery activities with a focus on Species in the Spotlight
- Participate in international and regional agreements to further the U.S. policy on protected species conservation

Deliverables:
FY 2022 – FY 2026:

- ESA proposed and final listing regulations, Section 4(d) rules, and critical habitat regulations
- Formal and informal consultation with other Federal agencies
- Recovery plans for newly listed species with specific actions to prevent species extinction
- Timely issuance of MMPA and ESA permits, including scientific research permits and incidental harassment authorizations
- Improved or newly developed abundance and fishery mortality estimates for stocks
- MMPA List of Fisheries classifying U.S. commercial fisheries into one of three Categories according to the level of incidental mortality or serious injury of marine mammals
- Marine Mammal Stock Assessment Reports

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Explanation and Justification

Comparison by subactivity		2020 Actuals Personnel	2020 Actuals Amount	2021 Enacted Personnel	2021 Enacted Amount	2022 Base Personnel	2022 Base Amount
Marine Mammals, Sea Turtles, and Other Species	Pos/BA	450	121,462	489	123,889	489	128,485
	FTE/OBL	401	118,359	402	123,889	402	128,485
Species Recovery Grants	Pos/BA	2	6,992	4	6,933	4	6,945
	FTE/OBL	2	6,995	2	6,933	2	6,945
Atlantic Salmon	Pos/BA	23	6,457	23	6,438	23	6,671
	FTE/OBL	22	6,774	22	6,438	22	6,671
Pacific Salmon	Pos/BA	308	64,753	337	66,246	337	69,671
	FTE/OBL	288	65,089	288	66,246	288	69,671
Total Protected Resources Science and Management	Pos/BA	783	199,664	853	203,506	853	211,772
	FTE/OBL	713	197,217	714	203,506	714	211,772

Marine Mammals, Sea Turtles, and Other Species

Under the legislative authority of the ESA and MMPA, this budget line supports activities that conserve and recover species threatened or endangered with extinction, as well as most marine mammals. The programs under this budget line aim to sustain marine and anadromous species and the ecosystems on which they depend, and to enable economic development in a manner compatible with species conservation and recovery.

In addition to work supporting all ESA-listed species, NOAA continues to focus on the “Species in the Spotlight: Survive to Thrive” initiative, an innovative approach to marshal public and private support to slow, halt, and reverse the population decline of nine of our most endangered species—Hawaiian monk seals, Southern Resident killer whales, white abalone, Cook Inlet beluga whales,

North Atlantic right whales, Atlantic salmon, Pacific leatherback turtles, Sacramento River winter-run Chinook, and Central California Coast coho. (https://www.fisheries.noaa.gov/topic/endangered-species-conservation#species-in-the-spotlight)

Major components of this budget line include:

Listing (ESA Section 4): Any U.S. citizen or organization may petition NMFS to list a species as threatened or endangered, reclassify an already listed species, or revise designated critical habitat under the ESA. Once a petition is received, NMFS has 90 days to make an initial determination and 12 months for determining whether the listing or reclassification is warranted. Details of the Listing process can be found at https://www.fisheries.noaa.gov/national/endangered-species-conservation/listing-species-under-endangered-species-act.

Recovery (ESA Section 4): The ESA requires NMFS to use all methods and procedures to bring listed species to the point where the protections of the ESA are no longer necessary. NMFS oversees and conducts these methods and procedures to allow the species and its ecosystems to recover, as well as to ensure that listed species remain functioning members of the ecosystems we all depend upon. Details on the recovery actions can be found at https://www.fisheries.noaa.gov/national/endangered-species-conservation/recovery-species-under-endangered-species-act. These actions are important to provide communities with healthier ecosystems, cleaner water, greater opportunities for recreation, and the opportunity for current and future generations to share the benefits of diverse and healthy natural resources.

Species Stock Assessment and Monitoring (ESA Section 4, MMPA Sections 115 and 117): This program supports protected species stock assessment and monitoring activities using a variety of observation and survey methods, including use of marine acoustics, unmanned systems, surveys (ship, aerial, and shore-based), and telemetry. To adequately support management decisions, assessments are comprehensive and include estimates of abundance and distribution, as well as analysis of historical trends, serious injury and mortality levels, life history and demographics, and impacts of human activities (e.g., noise, climate, habitat, and ecosystem change). NMFS collects this basic assessment data so it can be as targeted as possible in prescribing mitigation measures that affect commercial and recreational activities. Details on marine mammal stock assessments can be found at https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments.

Research (ESA Section 4, MMPA Sections 115 and 117): NMFS conducts research to inform conservation and management actions, focusing on the biology, behavior, and health of marine mammal species; genetic differentiation; ecosystem interactions;

and effects of human activities on the recovery and conservation of protected species. Effective conservation requires understanding how human and natural factors influence the viability of marine species and their ecosystems.

Interagency Consultation (ESA Section 7): ESA Section 7 requires Federal agencies to ensure that any action they fund, authorize, or undertake is not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat that has been designated for these species. This consultation with Federal action agencies enables authorization for lawful activities—such as construction of roads and bridges, commercial fishing, or defense readiness training—in a manner that is compatible with species conservation and recovery.

Permits and Authorizations (ESA Section 10 and MMPA Sections 101 and 104): Under the ESA and MMPA, NMFS issues permits and authorizations (often with required mitigation measures) to allow activities that may result in the direct and indirect take of a protected species. Permits and take authorizations cover scientific research and the incidental take and harassment of marine mammals by otherwise lawful activities such as seismic surveys, construction activities, or military readiness training exercises when those activities are deemed to have negligible impact on the species. Details on permits and authorizations of protected species can be found at https://www.fisheries.noaa.gov/insight/understanding-permits-and-authorizations-protected-species.

Conservation Planning (ESA Section 10): When non-Federal entities—such as states, counties, local governments, and private landowners—wish to conduct an otherwise lawful activity that might incidentally, but not intentionally, “take” a listed species, an incidental take permit must first be obtained from NMFS. NMFS reviews the Conservation Plans submitted by permit applicants that are designed to offset harmful effects that a proposed activity might have on listed species and issues permits accordingly.

Bycatch Reduction (ESA Section 4, MMPA Section 118): Fishing gear can accidentally capture protected species, such as marine mammals, seabirds, and sea turtles. NMFS works with the fishing industry and others through Take Reduction Teams or other means to modify fishing gear or practices to minimize bycatch and its impact.

Co-Management with Alaska Native Organizations (MMPA Section 119): Co-management promotes full and equal participation by Alaska Natives in decisions affecting the subsistence management of marine mammals (to the maximum extent allowed by law) as a tool for conserving marine mammal populations in Alaska. NMFS has entered into agreements with Alaska Native groups to manage harvested marine mammal stocks, and will continue to actively engage in activities to support the cooperative management of these stocks under the agreements.

Marine Mammal Health and Stranding Response Program (MMPA Title IV): NMFS is the lead Federal agency to coordinate marine mammal stranding networks, responses, and investigations of marine mammal mortality events. The Marine Mammal Health and Stranding Response Program (MMHSRP) has also been highly successful in developing public-private partnerships that provide emergency response to live or dead marine mammals and investigate the health of marine mammal populations in the wild. The more than 100 stranding network partners are volunteers and trained professionals from nonprofit organizations; aquaria; universities; and coastal state, local, and Tribal governments. Each member plays an important role in helping NMFS meet our congressional mandates. Data collected from stranded animals are valuable for informing marine mammal stock assessment reports, identifying key species recovery activities, monitoring ocean health, and identifying natural and manmade causes of stranding, illness, and death in marine mammals around the United States. Details on the MMHSRP can be found at https://www.fisheries.noaa.gov/national/marine-life-distress/marine-mammal-health-and-stranding-response-program.

The Prescott Grants Program provides competitive grants to stranding network organizations to rescue, rehabilitate, or investigate sick, injured, or distressed live marine mammals and to determine the cause of death or disease of dead marine mammals. To date the program has led to significant improvements within the stranding network, enabling members to expand response coverage over wider geographic areas; enhance capabilities and data collection; upgrade rehabilitation facilities; evaluate rehabilitation success; increase understanding of the causes of disease and mortality, and provide safer operations for both animals and people.

Species Recovery Grants (ESA Section 6,Fish and Wildlife Coordination Act)
Recovery and conservation actions for listed species under NMFS jurisdiction are implemented through Species Recovery Grants, which are awarded to states and Tribes. Details on Species Recovery Grants can be found at https://www.fisheries.noaa.gov/grant/species-recovery-grants-states and https://www.fisheries.noaa.gov/grant/species-recovery-grants-tribes. For listed species, funding supports activities such as reducing or removing significant sources of mortality and injury, assessing and monitoring species status and trends, developing conservation plans, conserving habitat, and engaging the public in conservation efforts. Funding may also support monitoring of candidate species and recently delisted species.

Atlantic Salmon (ESA Sections 4, 7, 10)
These programs provide funding for the conservation and recovery of ESA-listed Atlantic salmon in the Northeast. Gulf of Maine Atlantic salmon are co-managed by NMFS, USFWS, the Maine Department of Marine Resources, and the Penobscot Indian Nation. Under the ESA, the Essential Fish Habitat provisions under Magnuson-Stevens Act, and a joint Statement of Cooperation with the co-managers, NMFS is responsible for marine stock assessments, designating critical habitat, estuary and marine interagency Section 7 consultations and habitat conservation planning, and minimizing dam impacts.

Pacific Salmon (ESA, All Sections)

Under the legislative authority of the ESA, NMFS conducts interagency Section 7 consultations, habitat conservation planning, and listing and recovery actions to protect and recover threatened and endangered Pacific salmon and steelhead. NMFS also conducts research, monitoring, and analysis to provide managers and regional stakeholders the tools and information necessary to advance salmonid recovery to ensure biological sustainability of Pacific salmonids and the ecosystems on which they depend. Partnerships among Federal, state, local, and tribal entities, together with non-governmental and private organizations, are key to restoring healthy salmon runs and securing the economic and cultural benefits they provide.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Marine Mammal, Sea Turtles and Other Species	Pos./BA	489	128,485	509	138,485	20	10,000
	FTE/OBL	402	128,485	417	138,485	15	10,000

Climate Vulnerable Species under ESA and MMPA (+$10,000, 15 FTE/20 Positions) – This request supports the integration of climate science into protected species management and assessments to address the impacts of climate change on marine mammals and threatened or endangered species. As climate change alters marine ecosystems, NOAA's trust resources, such as protected species and the habitats on which they depend, face new and unanticipated threats and impacts—both human and environmental in nature. As marine and coastal habitats change, we expect many species to become vulnerable, likely resulting in an increase in the number of petitions to list species under the ESA.

To prepare and respond to these changes, NOAA will implement actions to help protected species become more adaptable and resilient to climate change. This effort will support a two-pronged approach needed for climate-informed protected species management by: 1) improving the consideration of climate change in ESA and MMPA implementation activities in a consistent manner nationwide, and 2) data collection, analyses, and development of decision support systems to produce protected species relevant projections, threat assessments, management strategies, and recovery planning.

Specifically, the requested funds will support:

- Coordinating protected species climate change activities, such as scenario planning exercises, recovery planning, guidance development, and implementing climate-informed ESA and MMPA actions. ($2.0 million)
- Implementing recovery actions to improve resiliency of climate vulnerable species under the ESA. ($3.5 million)
- Developing protected species relevant climate-related impacts and threats projections for protected species management through the integration of climate information from the NOAA Climate and Fisheries Initiative and other sources. ($1.5 million)
- Long-term monitoring and research to fill critical gaps in our understanding of climate impacts on protected species to improve projections, threats assessments, recovery planning and evaluation of management strategies. ($3.0 million)

These efforts will improve our understanding of (1) the effects of climate change on marine and anadromous species and their habitats (e.g. shifting distributions; novel species interactions; changes in timing for migration, breeding, nesting etc.; changes in prey resources; changes in fisheries interactions/bycatch; disease; marine mammal health and strandings) and (2) the effectiveness of our actions (adaptation and conservation). This information will help NMFS determine the level of climate change risk to protected species or stocks and help identify and implement the most impactful recovery actions to adaptively manage our species and improve their resilience.

This request will help NOAA meet the Administration's climate research goals, including EO 14008, and is critical to ensuring NOAA produces research data, tools, and information products that are publicly accessible to facilitate climate change decision-making Nation-wide.

Schedule and Milestones:
FY 2022 – FY 2026:

- Implement recovery actions in recovery plans for climate vulnerable protected species.
- Respond to petitions to list species under the ESA due to climate change.
- Develop training materials to improve consistent inclusion of climate-related impacts in ESA and MMPA activities.
- Conduct scenario planning exercises for protected species vulnerable to climate change.
- Develop initial forecasts and projections for changes in protected species populations due to changing ecosystems.
- Implement long-term monitoring of protected species to better understand climate change-related impacts and effectiveness of our actions.

Deliverables:
FY 2022 – FY 2026:

- Decision support systems to help incorporate data on climate change impacts to protected species into management decisions.
- Complete 5-10 climate scenario planning exercises for protected species that are vulnerable to climate change.
- Update or develop 5-10 recovery plans for climate vulnerable protected species.
- Complete recovery activities in recovery plans for climate vulnerable protected species.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

	2022	2023	2024	2025	2026
Performance Measure:					
Number of climate related recovery activities being addressed					
With Increase	30	30	30	30	30
Without Increase	18	18	18	18	18
Outyear Costs:					
Direct Obligations	10,000	10,000	10,000	10,000	10,000
Uncapitalized	10,000	10,000	10,000	10,000	10,000
Budget Authority	10,000	10,000	10,000	10,000	10,000
Outlays	6,200	6,200	6,200	6,200	6,200
FTE	15	20	20	20	20
Positions	20	20	20	20	20

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Protected Resources Science and Management
Subactivity: Marine Mammals, Sea Turtles and Other Species
Program Change: Climate Vulnerable Species under ESA and MMPA

Title		Grade	Number	Annual Salary	Total Salaries
Fisheries Biologist		ZP-IV	1	103,690	103,690
Fisheries Biologist		ZP-III	3	72,750	218,250
Fisheries Biologist		ZP-III	4	70,821	283,284
Fisheries Biologist		ZP-III	1	72,355	72,355
Fisheries Biologist		ZP-III	3	66,662	199,986
Fisheries Biologist		ZP-III	2	72,299	144,598
Fisheries Biologist		ZP-III	1	71,987	71,987
Fisheries Biologist		ZP-III	2	71,987	143,974
Fisheries Biologist		ZP-III	1	68,864	68,864
Fisheries Biologist		ZP-III	2	64,649	129,298
Total			20		1,436,286
Less lapse	25.00%		(5)		(359,072)
Total full-time permanent (FTE)			15		1,077,215
2022 Pay Adjustment (2.7%)					29,085
					1,106,299

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	15
Total FTE	15
Authorized Positions:	
Full-time permanent	20
Total Positions	20

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Protected Resources Science and Management
Subactivity: Marine Mammals, Sea Turtles and Other Species

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	46,772	48,960	52,246	53,352	1,106
11.3	Other than full-time permanent	491	514	549	549	0
11.5	Other personnel compensation	637	667	712	712	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	47,900	50,141	53,507	54,613	1,106
12	Civilian personnel benefits	17,512	18,330	19,560	19,858	298
13	Benefits for former personnel	8	8	8	8	0
21	Travel and transportation of persons	1,169	1,223	1,223	1,223	0
22	Transportation of things	112	117	117	117	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	785	821	821	821	0
23.2	Rental Payments to others	493	516	516	516	0
23.3	Communications, utilities and misc charges	222	232	232	232	0
24	Printing and reproduction	115	120	120	120	0
25.1	Advisory and assistance services	5,355	5,605	5,605	7,964	2,359
25.2	Other services from non-Federal sources	16,205	16,962	16,962	20,079	3,117
25.3	Other goods and services from Federal sources	2,336	2,445	2,445	2,445	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	184	192	192	192	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	2,647	2,771	2,771	3,171	400
31	Equipment	1,465	1,534	1,534	1,854	320
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	21,850	22,871	22,871	25,271	2,400
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	1	1	1	0
44	Refunds	0	0	0	0	0
99	Total obligations	118,359	123,889	128,485	138,485	10,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Marine Mammals, Sea Turtles, and Other Species	Pos./BA	489	128,485	504	131,682	15	3,197
	FTE/OBL	402	128,485	413	131,682	11	3,197

Wind Energy: Protected Species Environmental Reviews and Science (+$3,197, 11 FTE/15 Positions) – This request will assess the effects of planned offshore energy activities on Endangered Species Act (ESA) listed species and critical habitat, coordinate Marine Mammal Protection Act (MMPA) incidental take authorizations, and conduct review of environmental impact statements (EIS) analyzing the impacts to living marine resources and affected communities under the National Environmental Policy Act (NEPA). Offshore wind development is rapidly expanding in the Northeast and Mid-Atlantic, as well as other areas of the United States, such as the West Coast, and represents a new use of our marine waters requiring substantial scientific and regulatory review. NMFS will work with the Bureau of Ocean Energy Management (BOEM) to minimize the effects of offshore energy projects on protected resources, fisheries, and important habitats in the region; reduce delays and minimize adverse economic impacts to the fishing industry and related coastal communities; and mitigate impacts to fisheries surveys in the Northeast and Mid-Atlantic. NOAA is requesting a total of $20.4 million in four complementary areas to address the rapid expansion and the impacts of offshore energy projects. The other components can be found in the following PPAs: Fisheries Ecosystem Science Programs and Services (see page NMFS-54); Fisheries Data Collections, Surveys, and Assessments (see page NMFS-79); and Fisheries Management Programs and Services (see page NMFS-86).

NMFS requests $3.2 million to provide dedicated resources for offshore energy assessment related to protected resources. Funds will allow NMFS to efficiently and effectively carry out increased ESA section 7 consultation and MMPA authorization work associated with new BOEM activities with opportunities for early engagement with BOEM and project proponents. They will also enable NMFS to minimize impacts and delays to existing workload carried by existing consultation biologists and authorization analysts. In addition, this funding supports the review of comprehensive and complex EIS's to ensure that BOEM considers reasonable alternatives with sufficient analysis to assess the impacts to protected resources. These tasks routinely require dedicated engagement with BOEM staff and contractors to ensure the analyses are sufficient to allow for NMFS' assessment and consultation as a cooperating agency, as well as an adopting agency with respect to our issuance of MMPA Incidental Take Authorizations. Funds will also allow NMFS to research interactions of protected species and their habitats with offshore wind energy. These funds

will focus on the operational needs associated with offshore wind projects in the Northeast and Mid-Atlantic region, as well as the West Coast, and represent an initial investment for NMFS to meet current and future challenges of regulatory and scientific review.

NOAA's expertise in managing ocean species and habitats is critical to supporting the Administration's priority of deploying 30 gigawatts of offshore wind by 2030, by facilitating responsible renewable energy development while protecting ecosystems.

Schedule and Milestones:

FY 2022 – FY 2026

- Consistent with the Administration's goal of achieving the capacity to generate 30 GW of offshore wind power by 2030, provide information, expert advice, and guidance to BOEM to implement offshore wind development for approximately 20 to 30 projects over a four to five year period beginning in FY 2022 that considers impacts to protected species and their habitats, with a particular focus on the critically endangered North Atlantic right whale.
- Through NMFS' role as both a Cooperating Agency and Adopting Agency under NEPA, identify and share living marine resources expertise and make recommendations upon potential environmental, biological, and socio-economic impacts on our trust resources on approximately 20 to 30 projects over a four to five year period by 2026.This will allow regulators and developers to consider the full scope of impacts.
- Complete thorough and timely ESA consultations and MMPA authorizations for project consultation and authorization requests that are based on the best available scientific information while fulfilling FAST-41[2] obligations.
- Advance management's understanding of and science-based evidence for the interactions of protected species and their habitats with offshore wind energy.
- Establish and support regional collaborative ecosystem-scale research and monitoring programs across project/ecosystem scales to develop the necessary understanding of fisheries, habitat, and protected species interactions with wind development and the associated cumulative impacts to these resources and the habitats and ecosystems on which they rely, including potential changes in oceanographic conditions.

Deliverables:

FY 2022- FY 2026

- NEPA reviews of the direct, indirect, short-term, long-term, and cumulative impacts to marine mammals, threatened and endangered species, ESA critical habitat, and resource users and associated communities.
- Input on project milestones and timelines, Draft Environmental Impact Statements, Final Environmental Impact Statements, and Records of Decision structure, content, and appropriate methodology for impact analysis to BOEM to improve document quality.

[2] P.L. 114-94 Title 41, Fixing America's Surface Transportation Act

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(Dollar amounts in thousands)

- Scientific manuscripts for publication in peer-reviewed journals to aid in establishing NMFS as a global leader on topics related to offshore wind and protected species science.
- Regional scientific frameworks for protected species and wildlife research and monitoring, developed with regional partners.
- In partnership with scientific and industry collaborators convene State of the Science Symposia on the status of protected species interactions with offshore wind energy. (FY 2022, FY 2024, FY 2026)

Performance Measures	2022	2023	2024	2025	2026
Reducing uncertainty of wind and fisheries impacts within regulatory reviewing process – Number of independent peer reviewed literature documenting the effects and impacts of offshore wind development on fisheries and protected species recovery and conservation					
With Increase	2	3	4	4	5
Without Increase	0	0	0	0	0
The number of wind energy projects where early and comprehensive coordination with BOEM and industry yields sufficient information and analysis to inform NMFS consultations and reviews, resulting in improved protection of NOAA Trust Resources					
With Increase	20	20	22	21	24
Without Increase	6	4	5	4	4

Outyear Costs:					
Direct Obligations	3,197	3,197	3,197	3,197	3,197
Capitalized	0	0	0	0	0
Uncapitalized	3,197	3,197	3,197	3,197	3,197
Budget Authority	3,197	3,197	3,197	3,197	3,197
Outlays	1,982	1,982	1,982	1,982	1,982
FTE	11	15	15	15	15
Positions	15	15	15	15	15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Protected Resources Science and Management
Subactivity: Marine Mammals, Sea Turtles, and Other Species

Title		Grade	Number	Annual Salary	Total Salaries
Fisheries Biologist		ZP-IV	2	102,601	205,202
Fisheries Biologist		ZP-IV	1	103,690	103,690
Fisheries Biologist		ZP-III	8	71,987	575,896
Fisheries Biologist		ZP-III	3	72,750	218,250
Fisheries Biologist		ZP-III	1	70,821	70,821
Total			15		1,173,859
Less lapse	25.00%		(4)		(293,465)
Total full-time permanent (FTE)			11		880,394
2022 Pay Adjustment (2.7%)					23,771
					904,165

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	11
Total FTE	11
Authorized Positions:	
Full-time permanent	15
Total Positions	15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Protected Resources Science and Management
Subactivity: Marine Mammals, Sea Turtles, and Other Species

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	46,772	48,960	52,246	53,150	904
11.3	Other than full-time permanent	491	514	549	549	0
11.5	Other personnel compensation	637	667	712	712	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	47,900	50,141	53,507	54,411	904
12	Civilian personnel benefits	17,512	18,330	19,560	19,786	226
13	Benefits for former personnel	8	8	8	8	0
21	Travel and transportation of persons	1,169	1,223	1,223	1,331	108
22	Transportation of things	112	117	117	117	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	785	821	821	845	24
23.2	Rental Payments to others	493	516	516	516	0
23.3	Communications, utilities and misc charges	222	232	232	232	0
24	Printing and reproduction	115	120	120	120	0
25.1	Advisory and assistance services	5,355	5,605	5,605	5,605	0
25.2	Other services from non-Federal sources	16,205	16,962	16,962	18,852	1,890
25.3	Other goods and services from Federal sources	2,336	2,445	2,445	2,445	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	184	192	192	192	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	2,647	2,771	2,771	2,779	8
31	Equipment	1,465	1,534	1,534	1,571	37
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	21,850	22,871	22,871	22,871	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	1	1	1	0
44	Refunds	0	0	0	0	0
99	Total obligations	118,359	123,889	128,485	131,682	3,197

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Species	Pos./BA	4	6,945	5	16,945	1	10,000
Recovery Grants	FTE/OBL	2	6,945	3	16,945	1	10,000

Species Recovery Grants Program (+$10,000, 1 FTE/1 Positions) – This request enhances conservation and recovery of marine and anadromous species by increasing tribal and state capacity for species recovery. States and tribes have management authorities and responsibilities for protected species within their jurisdictions and, as such, they are uniquely qualified to partner with NMFS in the implementation of recovery actions for listed species. The number of species requiring the protections of the ESA is increasing, climate change is anticipated to negatively impact the status of these species, and there are numerous recovery needs for currently listed species. These factors present a need for NMFS to increase investment in recovery and delisting efforts to ensure the resilience, adaptability and protection of our natural resources in an ever-changing environment.

Twenty-five states (including U.S. territories), are eligible for this funding. All federally recognized tribes are also eligible. With additional support, the program could fund more recovery programs and activities from states and tribes, address a greater number of high-priority recovery actions for a variety of listed species, with the goal of recovering these species to the point where protections under the ESA are no longer necessary.

Examples of accomplishments of funded work to date include: the captive breeding and release of white abalone into the wild to prevent extinction; the removal of dams and repair of water control structures to allow Atlantic salmon access to historical spawning grounds; significant outreach efforts to decrease fisheries interactions with Hawaiian monk seals; the assessment of Atlantic sturgeon spawning success and identification of fine-scale habitat use to fill critical data gaps; the establishment of coral nurseries and propagation of listed coral species; the monitoring of sea turtle populations and stranding and rescue support; and the passive acoustic monitoring of Cook Inlet Beluga whales to obtain information on foraging behavior effects of noise pollution.

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

There is an increasing need for NOAA to create and foster natural and economic resilience along our coasts through expertise and robust, on-the-ground partnerships and place-based conservation activities. Ecological restoration and community resilience, as outlined in EO 14008, are integral to NOAA and the Administration's climate strategy.

Schedule and Milestones:
FY 2022 – FY 2026:

- Solicit and review Species Recovery Grant proposals submitted by states and tribes for conservation and recovery programs and activities.
- Develop additional Section 6 agreements with states and territories.
- Amend current Section 6 agreements with states and territories to include newly listed species or those most urgently in need of conservation programs.

Deliverables:
FY 2022 – FY 2026:

- Award Species Recovery Grants to various states and tribes.
- Implement recovery actions identified in recovery plans to prevent species extinction.

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Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

	2022	2023	2024	2025	2026
Performance Measure:					
Number of recovery activities being addressed through Species Recovery Grants					
With Increase	85	85	85	85	85
Without Increase	35	35	35	35	35
Outyear Costs:					
Direct Obligations	10,000	10,000	10,000	10,000	10,000
Uncapitalized	10,000	10,000	10,000	10,000	10,000
Budget Authority	10,000	10,000	10,000	10,000	10,000
Outlays	6,200	6,200	6,200	6,200	6,200
FTE	1	1	1	1	1
Positions	1	1	1	1	1

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Protected Resources Science and Management
Subactivity: Species Recovery Grants
Program Change: Species Recovery Grants

Title		Grade	Number	Annual Salary	Total Salaries
Fisheries Biologist		ZP-III	1	72,750	72,750
Total			1		72,750
Less lapse	25.00%		(0)		(18,188)
Total full-time permanent (FTE)			1		54,563
2022 Pay Adjustment (2.7%)					1,473
					56,036

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	1
Total FTE	1
Authorized Positions:	
Full-time permanent	1
Total Positions	1

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Protected Resources Science and Management
Subactivity: Species Recovery Grants

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	268	265	274	330	56
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	268	265	274	330	56
12	Civilian personnel benefits	107	106	109	125	16
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	3	3	3	3	0
22	Transportation of things	0	0	0	0	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	37	37	37	40	3
25.2	Other services from non-Federal sources	0	0	0	0	0
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	0	0	0	0	0
31	Equipment	0	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	6,580	6,522	6,522	16,447	9,925
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	6,995	6,933	6,945	16,945	10,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Fisheries Science and Management

Goal Statement

The Fisheries Science and Management activity encompasses scientific and management activities to ensure sustainability of the Nation's marine fishery resources.

Base Program

In partnership with the eight Regional Fishery Management Councils, state and Federal partners, and regional fishery management organizations for international fisheries; NMFS manages marine fisheries, including aquaculture, using the best available science. NMFS actions supported by the Fisheries Science and Management activity result in sustainable fisheries harvest and production, rebuilding of depleted fish stocks, conservation of essential fish habitats, and other support for fishing businesses and communities. NMFS' science, which is rigorously peer-reviewed, ensures management decisions are based on the highest-quality scientific information. NMFS conducts science on species' responses to environmental changes; impacts of fishing and other human activities on fisheries and their habitat; and social, cultural, and economic behaviors that influence interactions between humans and marine fisheries.

This activity also supports the regulatory process, which involves extensive opportunity for public input into management decisions, and thorough analysis of alternatives to meet statutory requirements and agency priorities. This work occurs in close coordination with Regional Councils, Interstate Marine Fisheries Commissions, and states. It is a process where science informs management. Managers need high quality science to make important decisions to ensure sustainable fisheries, healthy ecosystems, and productive coastal communities. Data feeds into mathematical models that estimate stock biomass, fishing effort, and other reference points, as seen in the graphic below.

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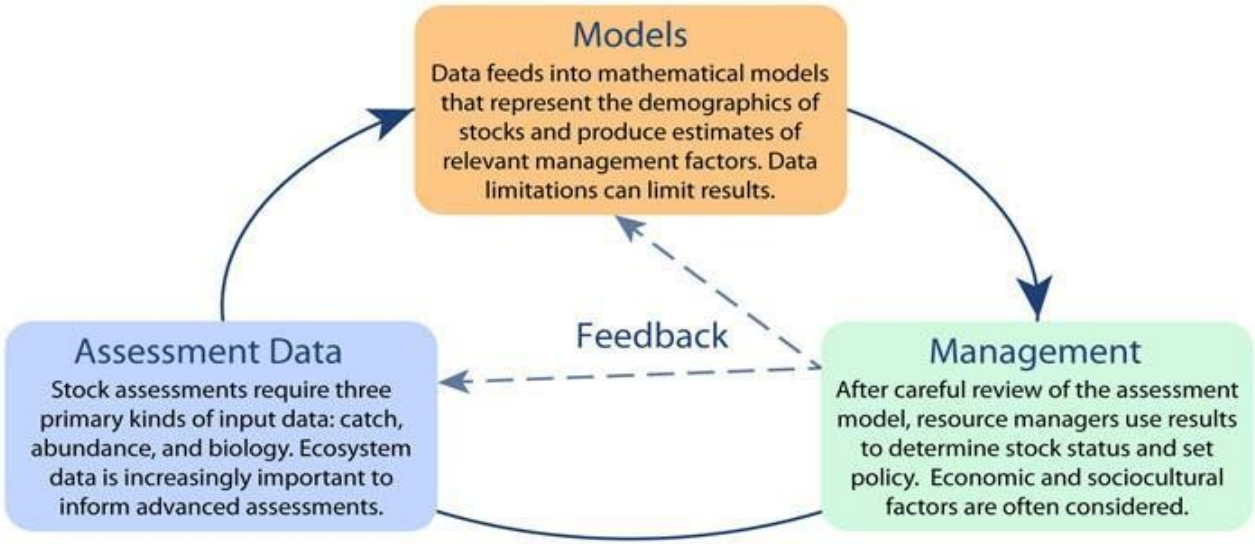
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)



Statement of Operating Objectives

Schedule and Milestones:
Fisheries and Ecosystem Science Programs and Services (FY 2022 – FY 2026):

- *Economics and Social Science*: Expand implementation of an integrated Bioeconomic Length-structured Angler Simulation Tool, the Social Indicator Toolbox, and FishSET—a spatial economics toolbox; assess the economic performance of fisheries; and predict the cost/benefits of stock rebuilding programs
- *Ecosystem Science*: Continue to work with resource managers to provide ecosystem-based science information and trade-off analyses to inform management decisions for evolving constituent-defined management issues in Integrated Ecosystem Assessment (IEA) regions; continue fisheries oceanography research programs to advance the understanding of environmental impacts on living marine resources to improve stock and ecosystem assessments; and continue to incorporate long-term observations of climate-related impacts on the Bering Sea ecosystem, and other regions, to help living marine resource managers incorporate climate-related impacts into management decisions

- *Antarctic Research:* Conduct assessments for key stocks managed by the Commission for the Conservation of Antarctic Marine Living Resources

- *Information Analysis and Dissemination*: Improve population dynamics/assessment/ management model development and data analysis tools to support fisheries science programs and improve data dissemination and sharing of integrated data and analyses (climatology, socio-economic, ecosystem, fishery-dependent, and fishery-independent), both internally and externally

Fisheries Data Collections, Surveys, and Assessments (FY 2022 – FY 2026):

- *Fisheries Monitoring, Assessment, and Forecasting:* Conduct and expand fishery-independent surveys; develop advanced sampling technologies to enhance data collection for stock assessments; improve timely delivery of fish stock assessments to fishery managers; and further the implementation of the next-generation stock assessment framework
- *Cooperative Research:* Issue awards for cooperative research from the Northeast Research Set-Aside, and the Southeast CRP competitive grants; and conduct cooperative research surveys nationwide
- *MARMAP*: Perform fishery-independent assessments of reef fish abundance and life history characteristics of economically and ecologically important reef fish species in shelf and upper slope waters from Cape Lookout to Cape Canaveral
- *SEAMAP:* Conduct groundfish and plankton surveys in state and Federal waters, inshore and offshore longline surveys, and reef fish surveys in offshore waters

Observers and Training (FY 2022 – FY 2026):

- Provide safe and high-quality monitoring in 65 fisheries nationwide, with a goal of maintaining high-priority observer programs and, as necessary, expanding observer coverage in existing fisheries and implementing new observer programs for fisheries identified with monitoring needs related to bycatch and protected species interactions
- Provide safe and high-quality monitoring in fisheries nationwide, with a goal of maintaining high-priority observer programs and, as necessary, expanding observer coverage in existing fisheries and implementing new observer programs for fisheries identified with monitoring needs related to bycatch and protected species interactions
- Maintain monitoring for the fisheries with observer coverage to provide catch and bycatch data by supporting approximately 73,000 observed sea days annually
- Maintain monitoring for the fisheries with observer coverage to provide accurate catch and bycatch data
- Coordinate observer program activities at the national level by developing new standards, policies, and procedures to improve regional observer programs

Fisheries Management Programs and Services (FY 2022 – FY 2026):

- *Illegal, Unreported, and Unregulated (IUU) Fishing*: Address Magnuson-Stevens Fishery Conservation and Management Act (MSA) mandates to implement IUU/bycatch identification, monitoring, and certification procedures, and foreign nation capacity building. Submit biennial status reports to Congress. Review shipments of imported fishery products to monitor for IUU shipments and fraudulently labeled seafood
- *Reducing Bycatch:* Develop technological solutions and investigate changes in fishing practices designed to minimize bycatch of fish and protected species
- *Regional Fishery Management Councils Support*: Develop fishery management measures, using public input and the best available science and tools such as ACLs and AMs
- *Electronic Monitoring and Reporting*: Implement Electronic Monitoring (EM) and Electronic Reporting (ER) options in key fisheries
- *National Catch Share Program*: Work with interested Regional Councils to support catch share programs and the use of technology, when appropriate, to improve the cost-effectiveness of these programs

Aquaculture (FY 2022 – FY 2026):

- Establish and finalize environmental reviews for the Nation's first two Aquaculture Opportunity Areas (AOAs)
- Finalize a Programmatic Environmental Impact Statement for the Pacific Islands Region to analyze the potential environmental impacts of a proposed offshore aquaculture management program
- Continue scientific and other support for coastal shellfish farming
- Establish and expand regional pilot projects (e.g., kelp and seaweed farming, offshore aquaculture)
- Advance Science Center research to support environmentally sound aquaculture practices such as genetics and water quality modeling, and work with NOS to refine and apply aquaculture siting tools (e.g. Ocean Reports)
- Research sustainable finfish aquaculture feeds and genetics
- Develop science-based tools for management that ensure the efficient review of aquaculture permit applications
- Explore use of Public Private Partnerships (in collaboration with Federal, state, and industry partners) to support sustainable aquaculture development (e.g., to expand hatchery capacity, workforce development and training programs)

Salmon Management Activities (FY 2022 – FY 2026):

- Support the operations and maintenance of Columbia River hatcheries to mitigate the loss of fish production due to hydropower dams

- Conduct a broad range of salmon stock assessment and fishery monitoring programs in the Snake and Columbia Rivers

Regional Councils and Fisheries Commissions (FY 2022 – FY 2026):

- Continue to revise Fishery Management Plans (FMPs) and amendments to prevent overfishing, rebuild overfished fisheries, and promote sustainability
- Complete socioeconomic analyses for fishery management actions
- Work with Councils to implement electronic technologies for fishery monitoring
- Complete necessary environmental analyses and support Council action to remove regulations determined to be outdated, unnecessary, or ineffective, to reduce the burden on commercial and recreational fishermen

Deliverables:

Fisheries and Ecosystem Science Programs and Services (FY 2022 – FY 2026):

- *Economics and Social Science*: Assessments of the benefits/cost-effectiveness of fisheries rebuilding programs, habitat and protected species recovery programs, and decision support tools; and, improved quantitative models for conducting benefit-cost analyses and predicting how fishery participants will respond to changes in management measures
- *Ecosystem Science*: Updated ecosystem-status reports and risk and vulnerability assessments delivered to resource managers in the IEA regions; and delivery of environmental indicators and predicted impacts on managed species to appropriate stock assessment scientists and Regional FMCs
- *Antarctic Research*: Complete stock assessments for targeted stocks of krill, fishes, and crabs managed by the Commission for the Conservation of Antarctic Marine Living Resources
- *Information Analysis and Dissemination*: Technical expertise and capacity infrastructure for data collection, processing, sharing, and archiving for Integrated Ocean Observing System, NOAA Environmental Data Management Committee, NMFS Enterprise Data Management, NMFS Fisheries Information Systems, NMFS Marine Recreational Information Program, and Data.gov

Fisheries Data Collections, Surveys, and Assessments (FY 2022 – FY 2026):

- *Fisheries Monitoring, Assessment, and Forecasting*: Fishery-independent surveys to provide ongoing data for stock assessments; stock assessment reports based on a next-generation stock assessment framework for key stocks; and more precise estimates of recreational catch through improved surveys
- *Cooperative Research*: Conduct cooperative research projects, in partnership with stakeholders; and document the individual project final reports of the results, with data archived at the Fisheries Science Centers and added to the NMFS InPort Centralized documentation (metadata) repository

- *MARMAP*: Fishery-independent assessments of reef fish abundance and life history characteristics of economically and ecologically important reef fish species in shelf and upper slope waters from Cape Lookout to Cape Canaveral; resulting data provided for use in stock assessments and in support of other research and management needs
- *SEAMAP*: Surveys in inshore and offshore waters conducted and fishery, habitat, biological, and environmental data provided to Regional Councils for incorporation into regional species stock assessments and for development of effective fisheries and habitat management strategies

Observers and Training (FY 2022 – FY 2026):

- Information on catch, bycatch, discards, and biological data necessary for in-season monitoring and stock assessments; Also information on fishing effort, fishing gear, and specific fishing techniques that minimize bycatch
- National Observer Program (NOP) reports and biennial updates to the U.S. National Bycatch Report (NBR)

Fisheries Management Programs and Services (FY 2022 – FY 2026):

- Development of fisheries regulations, FMPs, and amendments in order to maintain and restore productive stocks important to commercial, recreational, tribal, and subsistence fisheries
- Analysis and research to identify, consult, and certify nations whose vessels engage in IUU fishing, and bycatch of Protected Living Marine Resources (PLMR) and certain shark catches on the high seas. May also result in recommendations to the Secretary of Commerce, after coordination with other Federal agencies, on possible fishery-product trade prohibitions and port restrictions on nations whose vessels engage in the above
- Collection of source data on fishery product imports tracing back to the harvest area and analysis of shipment documentation to verify accuracy and identify trends in import of IUU fishery products and fraudulently labeled seafood
- Improvements in fishing gear and fishing practices to reduce bycatch
- Implementation of cost-effective electronic technology applications that complement observer coverage, improve data collection and analysis, and lower the economic and time burden on fishermen for compliance with recordkeeping and reporting regulations

Aquaculture (FY 2022 – FY 2026):

- Increased domestic aquaculture production and associated jobs
- More efficient aquaculture permitting systems in state and Federal waters
- Communications products to inform the public about sustainable aquaculture science and management topics
- Reports on three complementary, interagency efforts to support sustainable aquaculture development: (1) regulatory efficiency, (2) science collaboration, (3) and economic development.

- Application of science-based tools for management that ensure the efficient review of aquaculture permit applications

Salmon Management Activities (FY 2022 – FY 2026):

- Maintenance of salmon smolt production as required under the Mitchell Act
- Broad range of salmon stock assessment and fishery monitoring programs in the Snake and Columbia Rivers

Regional Councils and Commissions (FY 2022 – FY 2026):

- Draft amendments to FMPs
- Collection and analysis of socioeconomic data on the impacts of fishery management actions
- Regulations removed that were determined to be outdated, unnecessary, or ineffective, to increase economic fisheries value or improve recreational activities and reduce burden on commercial and recreational fishermen

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Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

		2020 Actuals		2021 Enacted		2022 Base Program	
Line Item		Personnel	Amount	Personnel	Amount	Personnel	Amount
Fisheries and Ecosystem Science Programs and Services	Pos/BA	562	146,192	635	145,226	635	151,054
	FTE/OBL	503	157,393	506	145,226	506	151,054
Fisheries Data Collections, Surveys, and Assessments	Pos/BA	456	173,656	478	174,261	465	177,599
	FTE/OBL	435	177,302	437	174,261	424	177,599
Observers and Training	Pos/BA	133	54,469	158	54,936	158	56,052
	FTE/OBL	110	57,436	110	54,936	110	56,052
Fisheries Management Programs and Services	Pos/BA	452	126,921	471	122,540	471	127,331
	FTE/OBL	428	125,912	434	122,540	434	127,331
Aquaculture	Pos/BA	28	15,057	38	17,351	38	17,729
	FTE/OBL	33	15,635	36	17,351	36	17,729
Salmon Management Activities	Pos/BA	33	57,964	40	61,387	40	61,784
	FTE/OBL	35	58,037	36	61,387	36	61,784
Regional Councils and Fisheries Commissions	Pos/BA	9	40,204	13	41,114	13	42,516
	FTE/OBL	8	40,280	8	41,114	8	42,516
Interjurisdictional Fisheries Grants	Pos/BA	1	3,365	2	3,333	2	3,340
	FTE/OBL	1	3,580	1	3,333	1	3,340
Total Fisheries Science and Management	Pos/BA	1,674	617,828	1,835	620,148	1,822	637,405
	FTE/OBL	1,553	635,575	1,568	620,148	1,555	637,405

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Explanation and Justification

Sustainable fisheries play an important role in the Nation's economy by providing opportunities for commercial, recreational and subsistence fishing, and marine aquaculture to increase our Nation's supply of seafood. In 2016, commercial and recreational fisheries in the U.S. generated 1.7 million jobs throughout the national economy. In addition, commercial and recreational fishing generated $212.2 billion in sales impacts, $64.2 billion in income impacts, and $99.5 billion in value-added impacts.[3] The U.S. aquaculture industry produced $1.5 billion worth of seafood in 2017, which equals about 21 percent of total U.S. seafood production by value.[4] By ending overfishing, rebuilding stocks, applying an ecosystem-based management approach to the stewardship of fishery resources, and supporting development of marine aquaculture, we strengthen the near and long-term value of U.S. fisheries to commercial and recreational fishing businesses, fishing communities, and the national economy.

Fisheries and Ecosystem Science Programs and Services

This budget supports NMFS science to prevent and eliminate overfishing, rebuild overfished stocks, support sustainable aquaculture, conserve and restore habitats, and support fishing communities. The following are some of the major programs and activities funded within the budget line.

Fisheries Science Base Activities: NMFS conducts science used for the analysis and decision-making needed for ecosystem-based fisheries management, Fishery Management Plans (FMPs) and regulatory implementation, and enforcement to ensure compliance with regulations. Funding supports:

- Regional Science and Operations - core survey and science work in the regional Science Centers (Centers) such as fishery catch monitoring, survey and stock assessments, charters for survey vessels, fuel, supplies, etc. This includes research projects at the Centers, including collaborative research with other institutions on topics such as pelagic fisheries and groundfish.
- Recreational Fisheries Information, such as the Marine Recreational Information Program https://www.fisheries.noaa.gov/topic/recreational-fishing-data
- Science and management activities in support of the Marine National Monuments https://www.fisheries.noaa.gov/pacific-islands/habitat-conservation/marine-national-monuments-pacific
- West Coast Groundfish Management and Research - key stock assessment science that supports management of more than

[3] National Marine Fisheries Service. 2018. Fisheries Economics of the United States, 2016. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-F/SPO-187. Available at: https://www.fisheries.noaa.gov/resource/document/fisheries-economics-united-states-report-2016.

[4] National Marine Fisheries Service (2020) Fisheries of the United States, 2018. U.S. Department of Commerce, NOAA Current Fishery Statistics No. 2018 Available at: https://www.fisheries.noaa.gov/national/commercial-fishing/fisheries-united-states-2018. Note, due to data availability, aquaculture production data lags the rest of the publication by one year.

80 fish stocks along the coasts of Washington, Oregon, and California

- Development and implementation of EM and ER; working with industry to integrate technology into data collections and observations to improve the timeliness, quality, integration, cost effectiveness, and accessibility of fishery-dependent data (https://www.fisheries.noaa.gov/national/fisheries-observers/electronic-technologies)
- Science to substantially increase sustainable domestic aquaculture; enabling important contributions to the U.S. seafood supply, job creation in coastal communities, and reduced reliance on imported seafood (currently more than 80 percent of U.S. seafood is imported[5]). Marine aquaculture is also used to enhance commercial and recreational fisheries and restore habitats

Economics and Social Science Research (https://www.fisheries.noaa.gov/topic/socioeconomics)
NMFS economists and social scientists conduct legislatively mandated (e.g., NEPA, MSA) economic and social analysis for almost 300 rulemakings each year. Underpinning these assessments is a broad range of socio-economic data collection, modeling, and, increasingly, a number of commercial and recreational fisheries decision support tools. This work addresses traditional fishery management issues (e.g. effects of rebuilding programs, catch share programs, aquaculture, and fishery allocation decisions on fishermen and communities) and emerging coastal and marine resource management issues such as ecosystem services trade-offs and valuation, and community resilience.

Ecosystem Science (https://www.fisheries.noaa.gov/topic/ecosystems#science)
NMFS implements ecosystem-based approaches to management, which rely upon research that integrates biological, socio-economic, environmental, and oceanographic data into predictive models that improve NOAA's ability to manage resources over the long-term. This includes the Integrated Ecosystem Assessment (IEA) program, which assesses ecosystem status and trends relative to ecosystem management goals, analyze risks and uncertainty, and evaluate trade-offs between management options. (https://www.integratedecosystemassessment.noaa.gov/) This also includes the Climate Regimes & Ecosystem Productivity (CREP) program, which provides decision-makers with information on how climate variability and change are impacting U.S. marine ecosystems and the communities and economies that depend on them. CREP provides information, assessments, and projections of climate-related impacts on living marine resources of the Bering Sea and Gulf of Alaska. This area includes some of the Nation's richest commercial fishing grounds (6.0 billion pounds of seafood were landed in Alaska with a value of $1.8 billion in 2017[6]) as well as protected species and other resources that native communities depend on. CREP also supports an array of sensors designed to

[5] https://www.fishwatch.gov/sustainable-seafood/the-global-picture

[6] National Marine Fisheries Service. 2018. Fisheries of the United States, 2017. U.S. Department of Commerce, NOAA Current Fishery Statistics No. 2017. Available at: https://www.fisheries.noaa.gov/content/fisheries-united-states-2017 .

detect changes in nutrients, productivity, and biological abundances and diversity along a latitudinal gradient extending from the northern Bering Sea to the Chukchi and Beaufort Seas.

Antarctic Research

The U.S. Antarctic Marine Living Resources Convention Act requires that the Department of Commerce conduct directed scientific research to "achieve the United States goal of effective implementation of the objectives of the Convention [on the Conservation of Antarctic Marine Living Resources]." NOAA's Antarctic Ecosystem Research Program implements the U.S. AMLR program in support of U.S. policy interests related to Antarctic resource management. NMFS scientists operate land-based predator research (e.g., counting seals and penguins and monitoring their reproductive success, body condition, and diet) and ship-based research (e.g., conducting oceanographic, trawl surveys, acoustic surveys, and small boat operations) to describe the fundamental relationships between Antarctic krill, krill's predators, finfish, and key environmental variables under changing sea ice conditions. This program is NOAA's only dedicated, long term ecological presence in the Antarctic, with observations dating back to 1986. (https://swfsc.noaa.gov/aerd/)

Information Analysis and Dissemination

Requirements and directives for data collection, management, and dissemination are included in the MSA, Marine Mammal Protection Act (MMPA), Endangered Species Act (ESA), Aquaculture Act of 1980, Data Quality Act, and other policies and directives. The information analysis and dissemination program supports the NMFS infrastructure and staff that process, analyze, and produce data and disseminate it to resource managers and other users.

Fisheries Data Collections, Surveys, and Assessments

Funds in this budget line support data collection, data management, and fisheries stock assessment production. Providing accurate and timely assessments of fish and shellfish stocks that support commercial and recreational fisheries is one of NMFS' core functions. Stock assessments provide the technical basis for fishery management decisions, such as setting annual catch limits (ACLs) to achieve optimum yield from the fishery while avoiding overfishing and ecosystem harm. Stock assessment models estimate a stock's status over time and forecast future dynamics to advise fishery managers in their development of sustainable harvest levels. They are most reliable when they incorporate high quality data on fishery removals, stock abundance and biology, and ecosystem and environmental variability. (https://www.fisheries.noaa.gov/topic/population-assessments#fish-stocks)

The following are some of the major programs and activities funded within the budget line:

Expand Annual Stock Assessments

Activities include: catch monitoring and surveys; data analysis and stock assessment modeling; advanced sampling technologies; habitat, climate and other ecosystem indicators; and stock assessment model improvements. In addition, NMFS addresses critical gaps in stock assessments as identified in program reviews and the implementation of the new stock assessment improvement plan and prioritization process. This process defines target frequency and assessment levels for each stock and facilitates the implementation of a next generation stock assessment framework. This framework includes assessments linked to climate, ecosystem, and habitat dynamics where appropriate, and provides baseline monitoring for all Federally-managed fish stocks. (https://www.fisheries.noaa.gov/feature-story/stock-assessment-101-series-part-4-future-stock-assessments)

Fisheries Statistics
NMFS manages and conducts data collection, data processing, statistical analysis, information management, and statistical reporting activities for commercial and recreational fisheries. Accurate data and reliable statistics on fishing effort and catch are essential for assessing fish stocks, as well as for monitoring performance relative to wild fishery management targets and aquaculture objectives.

Fish Information Networks (FINs)
This program supports several state-Federal cooperative programs that coordinate data collection, data management, and information management activities, which are essential for accurate monitoring of commercial and recreational fishing impacts. These programs collect data and manage information on fishing participation, fishing effort, and catch. They also help collect fishery-dependent biological data needed for stock assessments. (https://www.fisheries.noaa.gov/national/commercial-fishing/fisheries-information-system-program)

Survey and Monitoring Projects
Projects include support for bluefin tuna tagging research, red snapper monitoring and research, West Coast groundfish surveys, Alaska extended jurisdiction programs, Maine and New Hampshire inshore trawl surveys, Bering Sea Pollock research, and Gulf of Maine groundfish assessment, to name a few. These targeted surveys and biological investigations improve the information available to conduct accurate stock assessments and directly contribute to the *Percentage of FSSI Stocks with Adequate Population Assessments and Forecasts* (*performance indicator 3.4*).

American Fisheries Act (AFA)
NMFS collects data to support the following management measures for the AFA: 1) regulations that limit access and allocate Bering Sea and Aleutian Islands (BSAI) pollock to the fishing and processing sectors of the BSAI pollock fishery, 2) regulations governing the formation and operation of fishery cooperatives in the BSAI pollock fishery, 3) regulations to protect other fisheries from spillover effects from the AFA, and 4) regulations governing catch measurement and monitoring in the BSAI pollock fishery.

Cooperative Research
NMFS conducts cooperative research to enable commercial and recreational fishermen to become involved in collecting fundamental fisheries information that supports management options. Through cooperative research, industry and other stakeholders can partner with NMFS and university scientists in all phases of the research program—planning the survey and statistical design, conducting research, analyzing data, and communicating results. (https://www.fisheries.noaa.gov/sustainable-fisheries/national-cooperative-research-program)

Marine Resources Monitoring, Assessment, and Prediction Program (MARMAP)
MARMAP is a cooperative fisheries project of NMFS and the South Carolina Marine Resources Research Institute (MRRI). For more than 40 years, the MRRI has conducted fishery-independent surveys and research on groundfish, reef fish, and coastal pelagic fishes between Cape Lookout, North Carolina and Cape Canaveral, Florida.

Southeast Area Monitoring and Assessment Program (SEAMAP)
SEAMAP supports the collection of fishery-independent data through state, Federal, and university partnerships by way of cooperative agreements. (https://www.fisheries.noaa.gov/southeast/funding-and-financial-services/southeast-area-monitoring-and-assessment-program-seamap)

Observers and Training
This budget line supports information and analyses on the biological, ecological, economic, and social aspects of the Nation's fisheries resources. The scientific data collected by observer programs provide critical inputs for population assessments of threatened and endangered species such as sea turtles, seabirds, and marine mammals, and for effective management of the Nation's fish stocks. The authority to place observers on commercial fishing and processing vessels is provided by the MSA, MMPA, and ESA. Fisheries observer programs are proven, unbiased, and valuable sources of information on the Nation's fisheries, and are a reliable and cost-effective means to collect fishery-dependent data.

Observers monitor fishing activities across all five NMFS regions, and collect data for a range of conservation and management issues in various fisheries. This includes information on fishing practices, vessel and gear characteristics, fishing locations and times, environmental conditions within the fishing grounds, catch and bycatch, and socio-economic data. (https://www.fisheries.noaa.gov/topic/fishery-observers)

Fisheries Management Programs and Services

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(Dollar amounts in thousands)

Under the MSA and other fisheries legislation, this budget line supports: management actions to effectively prevent and eliminate overfishing, rebuild overfished stocks, support sustainable aquaculture, develop and implement catch share programs, and implement ecosystem-based management to support sustainable fisheries, fishing businesses, and communities. As a result of this work 47 fish stocks since 2000 have been rebuilt and the number of stocks experiencing overfishing, or determined to be overfished are at near all-time lows.

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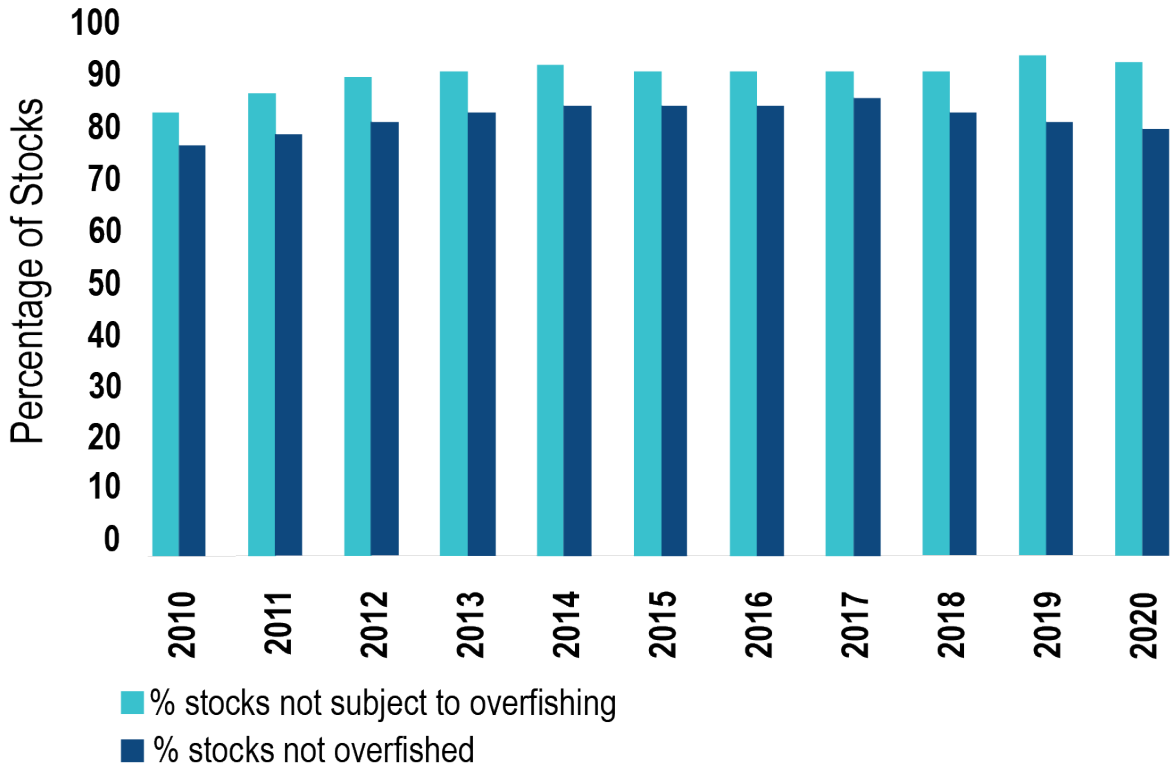
(Dollar amounts in thousands)

Percentage of Stocks Not Subject to Overfishing and Not Overfished 2010-2020



(Annual Report to Congress: Status of Stocks 2020.
https://www.fisheries.noaa.gov/national/sustainable-fisheries/status-stocks-2020

The following are some of the major programs and activities funded within the budget line:

Fisheries Management Base
These funds support NMFS staff efforts to deliver the following services, including analysis and decision-making to support fisheries management and regulatory implementation:

- Develop, implement, monitor and adjust (if required) Annual Catch Limits (ACLs) and Accountability Measures (AMs)
- Implement MSA International Requirements of international fishery management organizations
- Combat IUU Fishing [Note: Enforcement actions required to prosecute and deter IUU fisheries actions are covered in the NMFS Enforcement Activity]
- Develop and promulgate National Standard Guidance
- Support Regional Fishery Management Councils
- Incorporate Electronic Monitoring and Reporting technologies into fishery management

National Catch Share Program
NMFS supports the development, implementation, and improvement of catch share programs where determined appropriate by the regional fishery management councils. These programs have numerous benefits including increased flexibility for fishermen to determine when and how they fish. “Catch share” programs are a market-based approach to fisheries management that allocate a specific portion of the total allowable fishery catch to individuals, cooperatives, communities, or other entities. Depending on the nature of the fishery, catch share programs can provide significant advantages including ensuring annual catch limits are not exceeded, reducing costs to produce seafood, market gluts, and bycatch, extending fishing seasons, and improving fishermen’s safety.

Reducing Bycatch
NMFS supports research on gear technologies that reduce bycatch and bycatch mortality. Reducing bycatch can save fishing jobs by preventing fishery closures due to interactions with endangered species or attainment of strict bycatch quotas. This funding supports the Bycatch Reduction Engineering Program external competitive grants program, which supports innovative gear designs and fishing techniques to minimize bycatch.

Product Quality and Safety

Department of Commerce
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(Dollar amounts in thousands)

NMFS helps ensure that the Nation's seafood industry is economically sustainable and complies with food regulations. Funding supports the National Seafood Inspection Laboratory, which provides an analysis laboratory, data management, and regulatory compliance risk analysis. Voluntary services are also part of the program, and include sanitation evaluation, product inspection and certification, auditing of food quality and safety programs, and training.

Aquaculture

NMFS is one of three NOAA Line Offices that support NOAA's Marine Aquaculture Program, whose mission is to provide science, services, and policies to support the significant expansion and sustainability of U.S. marine aquaculture. Each NOAA Line Office has distinct and complementary roles:

- NMFS leads the program and focuses on developing policies, regulations, and science-based tools for management to support streamlined permitting systems. (https://www.fisheries.noaa.gov/topic/aquaculture)
- The Office of Oceanic and Atmospheric Research's (OAR) National Sea Grant College Program supports industry development and extension with integrated research and technology transfers primarily through competitive grants. (https://seagrant.noaa.gov/Our-Work/Aquaculture)
- NOS supports development of coastal planning tools to inform siting decisions (for example: https://coastalscience.noaa.gov/research/marine-spatial-ecology/aquaculture/)

This budget line supports efforts to increase aquaculture production in order to increase the Nation's seafood supply, improve our trade balance with other nations, and create jobs. NMFS' aquaculture activities are led by the Office of Aquaculture (OAQ). NMFS' base funding supports the following priority areas, which are guided by OAQ's 2016 Strategic Plan[7]:

- Increase regulatory efficiency: Develop coordinated, consistent, and streamlined regulatory processes for the marine aquaculture sector in collaboration with state and Federal partners. This includes establishing Aquaculture Opportunity Areas (AOAs), as directed by the Executive Order 13921 Promoting American Seafood Competitiveness and Economic Growth.
- Develop science-based tools for sustainable management: Develop science-based tools for management to support environmentally sustainable marine aquaculture, and ensure the efficient review of aquaculture permit applications using best available science.
- Improve technical and science-based production tools and techniques (e.g., disease prevention and treatment) in support of the Nation's shellfish farmers.
- Support regional pilot projects: Conduct regional pilot projects (e.g., kelp and seaweed farming, offshore aquaculture) in collaboration with industry and other partners.

[7] National Marine Fisheries Service. 2015. Marine Aquaculture Strategic Plan FY 2016-2020. U.S. Department of Commerce. Available at: https://www.fisheries.noaa.gov/webdam/download/65605834

- Inform the public: Develop outreach products and conduct activities to improve public understanding of marine aquaculture.

The U.S. is a major consumer of aquaculture products, yet is a minor producer. The Nation imports more than 85 percent of its seafood[8], over half of which is from foreign-produced aquaculture. This reliance on foreign imports resulted in an over $16 billion seafood trade deficit in 2018, moves potential seafood jobs overseas, and poses a risk to food security. Given wild fish stocks are at or near maximum harvest levels, the single greatest opportunity to increase the seafood supply is through domestic aquaculture.

Salmon Management Activities

This budget line supports NMFS' research and management activities associated with salmon not listed under the ESA. Funding for the Mitchell Act component supports the operations and maintenance of Columbia River hatcheries through grants and contracts to the states of Washington, Oregon, and Idaho, and to the U.S. Fish and Wildlife Service, to mitigate the loss of salmon on the Columbia and Snake Rivers.

The Pacific Salmon Treaty component funds NMFS and the states of Alaska, Washington, Oregon, and Idaho to provide personnel support to the Pacific Salmon Commission's technical committees and conduct a broad range of salmon stock assessment and fishery monitoring programs required to implement the treaty provisions. These programs are carried out in fisheries and rivers located from southeast Alaska to Oregon, including the Columbia River. U.S. and Canadian Parties negotiated amendments to five Pacific Salmon Treaty fishing regimes contained in Annex IV that expired at the end of 2018. Development and implementation of a new agreement began in 2019, in which conservation concerns are addressed through recommendations for reduced harvest of Chinook salmon in both United States and Canadian fisheries. With the funds provided in FY 2020, NMFS will develop a spend plan and support these new projects.

Base funds also support genetic stock identification research which includes the collection, analysis, and testing of methods that rely on genetics-based data to identify and track the location of federally protected stocks in the wild. Genetic stock identification programs improve salmon management and avoid harvest of weak salmon stocks by identifying the movement and location of individual stocks.

Regional Councils and Fisheries Commissions

[8] National Marine Fisheries Service (2020) Fisheries of the United States, 2018. U.S. Department of Commerce, NOAA Current Fishery Statistics No. 2018, p. 16. Available at: https://www.fisheries.noaa.gov/national/commercial-fishing/fisheries-united-states-2018. (Note: due to data availability, aquaculture production data lags the rest of the publication by one year.)

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NOAA is the sole source of funding for the eight Regional Fishery Management Councils. The Councils were established by the MSA to prepare FMPs aimed at preventing and eliminating overfishing and rebuilding overfished stocks for the Nation's fisheries. Funding in this budget line is divided among the eight Councils and is used for their operating costs (e.g., staff, rent, public meetings, Council member salaries, and travel). Funding also supports the activities of the Interstate Marine Fisheries Commissions, and International Fisheries Commissions. Funds provide critical operational support to the commissions and states for development and implementation of sustainable fishery management measures.

Interjurisdictional Fisheries Grants

The Interjurisdictional Fisheries Act of 1986 (IFA) is a formula-based financial assistance program to promote state activities in support of the management of interjurisdictional fisheries resources. Any state, either directly or through an interstate commission, may submit a grant proposal that supports management of fishery resources that: 1) occur in waters under the jurisdiction of one or more states and in the U.S. EEZ; 2) are managed under an interstate FMP; or (3) migrate between the waters under the jurisdiction of two or more states bordering on the Great Lakes. Past examples of projects funded through these grants include research on: blue crab spawning in Florida; American lobster settlement in Maine; and, fishery catch statistics, stock status, and management actions for state of Alaska managed fisheries including sablefish, lingcod, black and blue rockfish, and Pacific cod.

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Fisheries and Ecosystem Science Programs and Services	Pos./BA	635	151,054	665	161,054	30	10,000
	FTE/OBL	506	151,054	529	161,054	23	10,000

Climate-Ready Fisheries: Climate-Informed Fisheries Assessments and Management Strategies for Changing Oceans (+$10,000, 23 FTE/ 30 Positions) – This request will support the expanded production, delivery, and use of climate science in fisheries assessments and management to address the impacts of climate change on marine resources, fisheries, and the many businesses and communities that depend on them. Warming oceans, rising seas, decreasing sea ice, increasing ocean acidification, and extreme events (e.g., marine heat waves) are affecting the distribution and abundance of marine species in many regions. These changes impact nearly every aspect of the NMFS' mission, from fisheries management and aquaculture to protected resources conservation and habitat restoration. The pace and scope of change severely impact NMFS' ability to deliver robust stock assessments and identify effective management strategies, putting valuable fisheries, aquaculture operations, and resource-dependent communities and economies at risk. To prepare for and respond to these changes, NMFS will establish an operational system that provides decision-makers with climate-informed advice on changing ocean conditions, impacts on marine resources, and best management strategies to reduce impacts and increase economic resilience (Figure 1).

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(Dollar amounts in thousands)

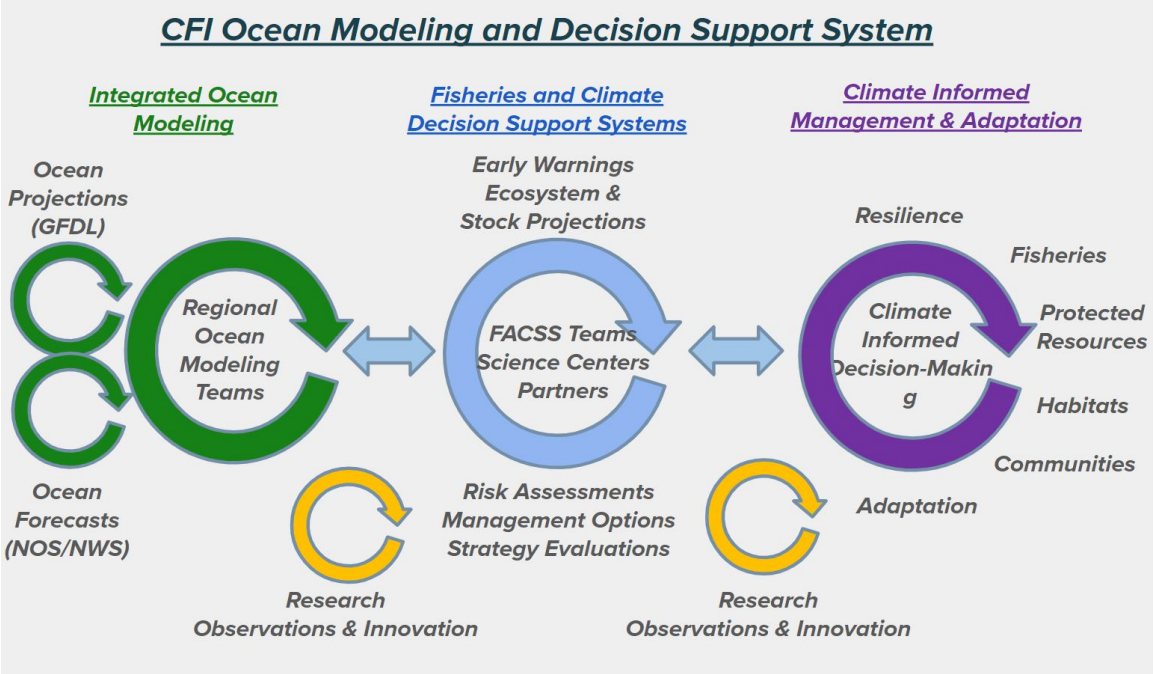

Figure 1: The role of FACCS teams in the Climate and Fisheries Initiative

As part of the NOAA Climate and Fisheries Initiative (CFI), this effort will establish Fisheries and Climate Decision Support Systems (FACSSs) at NOAA Fisheries Science Centers in five regions (Northeast, Southeast, California Current, Alaska (Bering Sea + Gulf of Alaska) and Pacific Islands) to deliver the climate-informed advice needed for effective marine resource management in rapidly changing oceans. These FACSS teams will (1) forecast the impacts of changing oceans on marine ecosystems and fisheries, (2) incorporate this information into stock assessments and other management advice, and (3) work with Fishery Management Councils and other decision-makers to evaluate best management strategies for changing oceans. The FACSS are a critical part of the new CFI integrated ocean modeling and decision-support system that will provide the end-to-end ocean forecasts, risk assessments, adaptation strategies and other services needed to safeguard the nation's valuable fisheries, aquaculture and protected resources in a time of rapidly changing oceans.

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Specifically, NMFS will fund the following activities: Six positions in each of the five regions to establish interdisciplinary FACSS teams (physical, chemical, biological and socioeconomic experts) at NOAA Fisheries Science Centers dedicated to producing regional ocean, ecosystem and fisheries projections, risk assessments, and management strategy evaluations needed for climate-informed fisheries management. ($3.0 million)

- IT capacity required for operational modeling of future conditions and evaluation of best management strategies. ($1.0 million)
- Targeted research to fill critical gaps in our understanding of climate impacts on stock productivity and fisheries adaptations and continuously improve future projections, risk assessments and evaluation of best fishery management strategies for changing conditions. ($5.0 million)
- Translation and delivery of fisheries projections, risk assessments and best management strategies to decision-makers. ($1.0 million)

Research is a core capability of NOAA. This request will help NOAA meet the Administration's climate research goals, including EO 14008, and is critical to ensuring NOAA produces research data, tools, and information products that are publically accessible to facilitate climate change decision-making Nation-wide.

Schedule and Milestones:

FY 2022 – FY 2026:

- Establish fisheries and climate forecast and assessment teams (FY 2022)
- Develop and test forecasts of future ecosystem and fisheries conditions (FY 2023)
- Launch targeted research on climate impacts to improve forecasts and assessments (FY 2023)
- Deliver forecasts of future ecosystems and fisheries for use in assessing risks, stocks, management strategies etc. (FY 2023)
- Assess climate-related risks and evaluate best fishery management strategies over near and longer timeframes working with Regional Fishery Management Councils and stakeholders (FY 2024-2025)
- Fisheries and Climate Decision Support System is operational and delivering robust forecasts and assessments on an annual basis to support climate-informed fisheries management (FY 2025)

Deliverables:

FY 2022 – FY 2026:

- Fisheries and climate forecast and assessment teams in five regions (FY 2022)
- Pilot forecasts of future ecosystem and fishery conditions (FY 2023)
- Operational forecasts of future ecosystem and fisheries conditions (priority stocks) (FY 2023)
- Assessments of risks and best fishery management strategies for future scenarios (priority stocks) (FY 2024-2025)

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- Increased information on climate impacts, risks and management strategies to improve forecasts and assessments (FY 2024)
- Operational Fisheries and Climate Decision Support Systems in five regions (FY 2025)

Performance Measures	2022	2023	2024	2025	2026
Number of NMFS regions with fisheries and climate decision support systems					
With Increase	1	1	4	5	5
Without Increase	0	1	1	1	1
Outyear Costs:					
Direct Obligations	10,000	10,000	10,000	10,000	10,000
Capitalized	0	0	0	0	0
Uncapitalized	10,000	10,000	10,000	10,000	10,000
Budget Authority	10,000	10,000	10,000	10,000	10,000
Outlays	6,200	6200	6200	6200	6200
FTE	23	30	30	30	30
Positions	30	30	30	30	30

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PROGRAM CHANGE PERSONNEL DETAIL

Activity: Fisheries Science and Management
Subactivity: Fisheries and Ecosystem Science Programs and Services

Title		Grade	Number	Annual Salary	Total Salaries
Fisheries Biologist		ZP-IV	9	100,940	908,460
Fisheries Biologist		ZP-IV	6	102,601	615,606
Fisheries Biologist		ZP-IV	6	95,012	570,072
Fisheries Biologist		ZP-IV	3	103,126	309,378
Fisheries Biologist		ZP-IV	6	98,151	588,906
Total			30		2,992,422
Less lapse	25.00%		(7)		(748,106)
Total full-time permanent (FTE)			23		2,244,317
2022 Pay Adjustment (1%)	2.70%				60,597
					2,304,914

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	23
Part-time permanent	0
Full-time temporary	0
Part-time temporary	0
Total FTE	23
Authorized Positions:	
Full-time permanent	30
Part-time permanent	0
Full-time temporary	0
Part-time temporary	0
Total Positions	30

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Fisheries Science and Management
Subactivity: Fisheries and Ecosystem Science Programs and Services

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	69,044	63,704	67,878	70,183	2,305
11.3	Other than full-time permanent	591	546	582	582	0
11.5	Other personnel compensation	1,871	1,727	1,840	1,840	0
11.8	Special personnel services payments	23	21	22	22	0
11.9	Total personnel compensation	71,529	65,998	70,322	72,627	2,305
12	Civilian personnel benefits	24,886	22,962	24,466	25,042	576
13	Benefits for former personnel	26	24	24	24	0
21	Travel and transportation of persons	1,068	985	985	985	0
22	Transportation of things	445	411	411	411	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	2,857	2,636	2,636	2,636	0
23.2	Rental Payments to others	415	383	383	383	0
23.3	Communications, utilities and misc charges	4,403	4,063	4,063	4,063	0
24	Printing and reproduction	158	146	146	146	0
25.1	Advisory and assistance services	11,502	10,613	10,613	13,565	2,952
25.2	Other services from non-Federal sources	17,272	15,937	15,937	18,834	2,897
25.3	Other goods and services from Federal sources	833	769	769	769	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	4,264	3,935	3,935	4,685	750
31	Equipment	4,655	4,295	4,295	4,815	520
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	13,079	12,068	12,068	12,068	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	1	1	1	0
44	Refunds	0	0	0	0	0
99	Total obligations	157,393	145,226	151,054	161,054	10,000

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(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase/Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Fisheries Ecosystem Science Programs and Services	Pos./BA	635	151,054	649	154,702	14	3,648
	FTE/OBL	506	151,054	517	154,702	11	3,648

Wind Energy: Fisheries Science & Technical Reviews (+$3,648, 11 FTE/14 Positions) – This request will assess the effects of planned offshore energy activities on fish, fisheries, and ecosystems. Offshore wind development is rapidly expanding in the Northeast and Mid-Atlantic, as well as other areas of the United States, such as the West Coast, and represents a new use of our marine waters requiring substantial scientific and regulatory review. NMFS will work with the Bureau of Ocean Energy Management (BOEM) to minimize the effects of offshore energy projects on protected resources, fisheries, and important habitats in the region; reduce delays and minimize adverse economic impacts to the fishing industry and related coastal communities; and mitigate impacts to fisheries surveys in the Northeast and Mid-Atlantic. NOAA is requesting a total of $20.4 million in four complementary areas to address the rapid expansion and the impacts of offshore energy projects. The other components can be found in the following PPAs: Marine Mammals, Sea Turtles, and Other Species (see page NMFS-19); Fisheries Data Collections Surveys, and Assessments (see page NMFS-79); and Fisheries Management Programs and Services (see page NMFS-86).

NMFS requests $3.6 million to provide dedicated resources for offshore energy assessment to support the regulatory review process, including technical review, data analysis, and generation of recommendations for EFH, ESA, and NEPA consultation processes. This will also fund projects that advance scientific understanding on the interaction of offshore wind on NOAA trust resources. There are significant scientific questions regarding the interaction between wind-development and fisheries. NMFS will address these questions and mitigate impacts to fisheries by providing socio-economic analyses, application of integrated ecosystem assessments, and development of cooperative fisheries research studies. NMFS will focus on the operational needs associated with offshore wind projects in the Northeast and Mid-Atlantic region and make an initial investment in meeting current and future challenges of regulatory and scientific review. These funds will also enable an initial, minimal focus on operational needs on the West Coast.

NOAA's expertise in managing ocean species and habitats is critical to supporting the Administration’s priority of deploying 30 gigawatts of offshore wind by 2030, by facilitating responsible renewable energy development while protecting ecosystems.

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(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022 – FY 2026

- Consistent with the Administration's goal of achieving the capacity to generate 30 GW of offshore power by 2030, provide scientific information, expert advice, and guidance to BOEM to implement offshore wind development for approximately 20 to 30 projects over a four to five year period beginning in FY 2022 that considers impacts to:
    - Protected species and their habitats, with a particular focus on the critically endangered North Atlantic right whale;
    - Socio-economic impacts from offshore wind development; and,
    - Essential fish habitats, with particular focus on vulnerable complex habitats and life stages.
- Through our role as a Cooperating Agency under NEPA, identify and share living marine resources expertise and make recommendations upon potential environmental, biological, and socio-economic impacts on our trust resources on approximately 20 to 30 projects over a four to five year period by 2026.This will allow regulators and developers to consider the full scope of impacts.
- Advance management's understanding of and science-based evidence for the interactions of fisheries and their habitats with offshore wind energy.
- Establish and support regional collaborative ecosystem-scale research and monitoring programs across project/ecosystem scales to develop the necessary understanding of fisheries, habitat, and protected species interactions with wind development and the associated cumulative impacts to these resources and the habitats and ecosystems on which they rely, including potential changes in oceanographic conditions.

Deliverables:
FY 2022- FY 2026

- Scientific information for NEPA reviews of the direct, indirect, short-term, long-term, and cumulative impacts to marine mammals, threatened and endangered species, fisheries resources and essential fish habitats, and resource users and associated communities.
- Input on Draft Environmental Impact Statements, Final Environmental Impact Statements, and Record of Decisions structure, content, and appropriate methodology for impact analysis to BOEM to improve document quality.
- Scientific manuscripts for publication in peer-reviewed journals to aid in establishing NMFS as a global leader on topics related to offshore wind and fisheries science.
- Enhanced commercial and recreational fishery and socioeconomic data to improve BOEM decision-making and to improve the consideration of fishing industry considerations in the planning and development process.

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- Regional scientific frameworks for (1) fisheries research and monitoring and (2) protected species and wildlife research and monitoring, which were developed with regional partners.
- In partnership with scientific and industry collaborators convene State of the Science Symposia on the status of fisheries and protected species interactions with offshore wind energy. (FY 2022, FY 2024, FY 2026)
- Scientific support to establish a national Wind Center of Excellence to coordinate the review of wind projects nationwide.

Performance Measures	2022	2023	2024	2025	2026
Reducing uncertainty of wind and fisheries impacts within regulatory reviewing process – Number of independent peer reviewed literature documenting the effects and impacts of offshore wind development on fisheries and protected species recovery and conservation					
With Increase	2	3	4	4	5
Without Increase	0	0	0	0	0
The number of wind energy projects where early and comprehensive coordination with BOEM and industry yields sufficient information and analysis to inform NMFS consultations and reviews, resulting in improved protection of NOAA Trust Resources					
With Increase	20	20	22	21	24
Without Increase	6	4	5	4	4

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Outyear Costs:	2022	2023	2024	2025	2026
Direct Obligations	3,648	3,648	3,648	3,648	3,648
Capitalized	0	0	0	0	0
Uncapitalized	3,648	3,648	3,648	3,648	3,648
Budget Authority	3,648	3,648	3,648	3,648	3,648
Outlays	2,262	2,262	2,262	2,262	2,262
FTE	11	14	14	14	14
Positions	14	14	14	14	14

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Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Fisheries Science and Management
Subactivity: Fisheries and Ecosystem Science Programs and Services

Title		Grade	Number	Annual Salary	Total Salaries
Fisheries Biologist		ZP-IV	3	102,601	307,803
Fisheries Biologist		ZP-III	7	71,987	503,909
Fisheries Biologist		ZP-III	1	72,750	72,750
Fisheries Biologist		ZP-III	1	70,821	70,821
Fisheries Biologist		ZP-III	1	72,355	72,355
Fisheries Biologist		ZP-II	1	48,641	48,641
Total			14		1,076,279
Less lapse	25.00%		(3)		(269,070)
Total full-time permanent (FTE)			11		807,209
2022 Pay Adjustment (2.7%)					21,795
					829,004

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	11
Total FTE	11
Authorized Positions:	
Full-time permanent	14
Total Positions	14

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PROGRAM CHANGE DETAIL BY OBJECT CLASS

(Direct Obligations amounts in thousands)

Activity: Fisheries Science and Management

Subactivity: Fisheries and Ecosystem Science Programs and Services

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	69,044	63,704	67,878	68,707	829
11.3	Other than full-time permanent	591	546	582	582	0
11.5	Other personnel compensation	1,871	1,727	1,840	1,840	0
11.8	Special personnel services payments	23	21	22	22	0
11.9	Total personnel compensation	71,529	65,998	70,322	71,151	829
12	Civilian personnel benefits	24,886	22,962	24,466	24,673	207
13	Benefits for former personnel	26	24	24	24	0
21	Travel and transportation of persons	1,068	985	985	1,143	158
22	Transportation of things	445	411	411	411	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	2,857	2,636	2,636	2,776	140
23.2	Rental Payments to others	415	383	383	383	0
23.3	Communications, utilities and misc charges	4,403	4,063	4,063	4,063	0
24	Printing and reproduction	158	146	146	146	0
25.1	Advisory and assistance services	11,502	10,613	10,613	10,613	0
25.2	Other services from non-Federal sources	17,272	15,937	15,937	17,743	1,806
25.3	Other goods and services from Federal sources	833	769	769	769	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	4,264	3,935	3,935	3,949	14
31	Equipment	4,655	4,295	4,295	4,349	54
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	13,079	12,068	12,068	12,508	440
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	1	1	1	0
44	Refunds	0	0	0	0	0
99	Total obligations	157,393	145,226	151,054	154,702	3,648

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Fisheries and Ecosystem Science Programs and Services	Pos./BA	635	151,054	642	154,054	7	3,000
	FTE/OBL	506	151,054	511	154,054	5	3,000

Advancing and Improving Territorial Fisheries Science and Management (+$3,000, 5 FTE/ 7 Positions) – NMFS will increase science and management efforts for economically and culturally significant fisheries located within U.S. Pacific and Caribbean territories. Several fisheries are at-risk of overfishing, impacting the livelihoods of these underserved communities, and immediately require bolstering of current science and management efforts. Local territorial fisheries agencies will benefit greatly from additional resources and support to address gaps in effective reporting, data collection, and complementary management measures.

This proposal will advance NOAA's environmental justice efforts by providing support to the Pacific Island territories for meaningful involvement of diverse local communities in fisheries science and management. NMFS will use $2.0 million to tackle urgent fishery science and management gaps in Pacific Island territories of American Samoa, Guam, and the Commonwealth of the Northern Marianas Islands (CNMI), focusing on the stock status of key economic resources at risk of overfishing (e.g. territorial bottomfishes). Fishing and seafood are integral to local community ways of life and culture in this region. Funds will improve data to reduce uncertainty in stock assessments, and establish staff positions to support cooperative projects. NMFS staff will conduct in-person outreach and education for local territorial management agencies and the fishing community to inform them on the science and management implications of stock assessments, including the introduction and implementation of e-reporting. These actions are the first steps to end the current overfishing/overfished situations in American Samoa and Guam.

NMFS will invest $1.0 million in the Caribbean to provide equitable science and management support to local fisheries management agencies. Available U.S. Caribbean data sources and potential assessment techniques indicate data limitations significantly degrade the development of quantitative management advice required under the MSA. Annual catch limits in the U.S. Caribbean currently use highly uncertain landings data, potentially limiting optimum yield for the fishery. Well-designed fishery independent surveys will provide immediate benefits by enabling the use of data-limited stock assessment techniques, facilitating the evaluation of

management options (e.g. Marine Protected Areas), and contributing to ecosystem based fisheries management objectives. Specifically, NMFS will provide support to local fisheries, and fund cooperative data collection and survey efforts. NMFS will implement these actions through extensive capacity building and engagement with local fishing communities and universities. This cooperative approach is cost-effective, and ensures territorial scientists, managers and communities participate as effective partners in the management of their local marine resources.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

Schedule and Milestones:
FY 2022 – FY 2026:
Pacific Islands

- Establish quarterly meetings (FY 2022) through fisheries liaisons, inaugural coordination meetings in each territory (FY 2022), and training workshops (FY 2024-2026) for movement to e-reporting for creel and commercial reporting.
- Establish grant proposals for territorial agency funding (per territory) and a biosampling program for American Samoa (FY 2022-2023)
- Review fishery-dependent (creel survey and expansion) data and fishery-independent (mapping, video, eDNA) data for surveys (FY 2022-2023)
- Establish a timeline and implementation plan for creel database modernization and new commercial system (FY 2022-2023)

Caribbean

- Develop outreach and education programs and materials (FY 2022), for programs to be conducted on an annual basis (FY 2023-2026)
- Establish collaborative partnerships with local fishing communities and universities (FY 2022-2026)
- Review and assimilate available data to inform design of fisheries independent survey or enhanced data collection activities in coordination with territorial agencies (FY 2022), collect data to refine proposed surveys (FY 2023-2026)

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Deliverables:
FY 2022 – FY 2026:
Pacific Islands

- Conduct three fishery coordination meetings (one per territory) and host virtual quarterly meetings (12 total per year) (inaugural FY 2022, then yearly)
- Three (one per territory) multi-year grants awarded for creel survey expansion and biosampling programs (FY 2022-2026)
- Complete reports of fish habitat maps for fishery independent surveys for American Samoa (FY 2022-2023), Guam (FY 2023-2024), and CNMI (FY 2024-2025)
- Complete three new fishery-independent surveys: American Samoa (FY 2025-2026), Guam (FY 2026), and CNMI (FY 2026).
- Complete replacement of territorial database with one centralized and standardized system for all three PI territories and replace paper logs with e-reporting interface (FY 2024)

Caribbean

- Development of new Caribbean outreach and education program (FY 2022)
- Collaborative partnerships with local fishing communities and universities established through territorial fisheries agencies (FY 2023-2026)
- New survey design (FY 2022) and database (FY 2023, to be updated annually thereafter, FY 2024-2026)

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(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of coordination meetings serving U.S. territories					
With Increase	15	15	15	15	15
Without Increase	0	0	0	0	0
Number of new survey databases serving U.S. territories (cumulative)					
With Increase	0	1	2	2	2
Without Increase	0	0	0	0	0

Outyear Costs:					
Direct Obligations	3,000	3,000	3,000	3,000	3,000
Capitalized	0	0	0	0	0
Uncapitalized	3,000	3,000	3,000	3,000	3,000
Budget Authority	3,000	3,000	3,000	3,000	3,000
Outlays	1,860	1,860	1,860	1,860	1,860
FTE	5	7	7	7	7
Positions	7	7	7	7	7

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Fisheries Science and Management
Subactivity: Fisheries and Ecosystem Science Programs and Services

Title		Grade	Number	Annual Salary	Total Salaries
Fisheries Biologist		ZP-III	1	66,662	66,662
Fisheries Biologist		ZP-IV	1	95,012	95,012
Fisheries Biologist		ZP-III	1	64,649	64,649
Fisheries Biologist		ZP-III	3	43,683	131,049
Fisheries Biologist		ZP-IV	1	98,151	98,151
Total			7		455,523
Less lapse	-25.00%		(2)		(113,881)
Total full-time permanent (FTE)			5		341,642
2022 Pay Adjustment (2.7%)	2.70%				9,224
					350,866

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	5
Part-time permanent	0
Full-time temporary	0
Part-time temporary	0
Total FTE	5
Authorized Positions:	
Full-time permanent	7
Part-time permanent	0
Full-time temporary	0
Part-time temporary	0
Total Positions	7

Exhibit 15

Department of Commerce
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Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Fisheries Science and Management
Subactivity: Fisheries and Ecosystem Science Programs and Services

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	69,044	63,704	67,878	68,229	351
11.3	Other than full-time permanent	591	546	582	582	0
11.5	Other personnel compensation	1,871	1,727	1,840	1,840	0
11.8	Special personnel services payments	23	21	22	22	0
11.9	Total personnel compensation	71,529	65,998	70,322	70,673	351
12	Civilian personnel benefits	24,886	22,962	24,466	24,554	88
13	Benefits for former personnel	26	24	24	24	0
21	Travel and transportation of persons	1,068	985	985	1,253	268
22	Transportation of things	445	411	411	411	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	2,857	2,636	2,636	2,636	0
23.2	Rental Payments to others	415	383	383	393	10
23.3	Communications, utilities and misc charges	4,403	4,063	4,063	4,083	20
24	Printing and reproduction	158	146	146	146	0
25.1	Advisory and assistance services	11,502	10,613	10,613	12,263	1,650
25.2	Other services from non-Federal sources	17,272	15,937	15,937	16,082	145
25.3	Other goods and services from Federal sources	833	769	769	769	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	4,264	3,935	3,935	3,955	20
31	Equipment	4,655	4,295	4,295	4,537	242
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	13,079	12,068	12,068	12,274	206
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	1	1	1	0
44	Refunds	0	0	0	0	0
99	Total obligations	157,393	145,226	151,054	154,054	3,000

Exhibit 13

Department of Commerce
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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Fisheries and Ecosystem Science Programs and Services	Pos./BA	635	151,054	637	152,054	2	1,000
	FTE/OBL	506	151,054	508	152,054	2	1,000

Community Social Vulnerability Indicators (CSVI) Toolbox (+$1,000, 2 FTE/ 2 Positions) – NMFS will expand the CSVI Toolbox – an interactive, online GIS-based decision-making tool – to include new metrics that address environmental justice (E.O. 12898), climate change concerns (Sec. 219 of E.O. 14008), and racial equity (E.O. 13985) in underserved coastal communities. Fishing communities can face considerable uncertainty from annual fluctuations in harvest and regulatory changes, which directly affect fishermen's household income. Furthermore, fishing communities, like all coastal communities, increasingly face threats from severe storms, flooding, and sea level rise. All of these factors may affect the social vulnerability of a community. NMFS has developed a number of mapping tools for visualizing fisheries information at the community level. NMFS CSVI Toolbox provides a suite of social indicators that reflect a community's ability to respond to change by providing metrics that identify the relative importance of commercial and recreational fishing to communities, putting the fisheries data in a human context.

The CSVI Toolbox is currently comprised of a suite of 14 statistically robust social, economic, and climate change metrics that uniquely characterize and evaluate a community's vulnerability and resilience to disturbances (e.g., harvest declines associated with management actions or stock collapse, extreme weather, oil spills, sea level rise, etc.). The publicly accessible indicator map and graphing tool enables users to analyze both environmental justice questions and the climate vulnerability of over 4,600 coastal communities in 23 states and is routinely used for National Environmental Policy Act (NEPA) and Magnuson-Stevens Act (MSA) social impact assessment analyses. The expanded toolbox will be able to identify communities with less capacity to adapt to the disturbances named above, which will support evaluation and implementation of policies to address environmental justice, climate change, and racial equity. It will inform policy initiatives by underscoring that 'one-size fits all" policies are not supported by currently available information, and thus will support better informed assessments and better targeted policies and programs.

This effort will build on the existing toolbox to provide relevant new metrics (including those relied upon by state governments) and geospatial tools. By expanding existing web mapping tools to allow integration with other relevant community data and tools (e.g., EPA, BLS and CDC), NMFS will improve actionable knowledge on the intersection between environmental justice and racial equity

issues in relation to climate change impacts in underserved communities. Actions include refinement of policy implementation to target underserved communities and will support assessment of the effectiveness of these policies. Updates to the sea level rise and storm surge indicators, and national expansion of the metric for community dependence on climate vulnerable species, will strengthen the utility of the CSVI Toolbox. To ensure use and application of the improved toolbox, a training and outreach program will be provided for analysts, Fishery Management Council staff, decision makers and stakeholders to ensure that these metrics are considered from the initial scoping stage of a fisheries regulation to analyses supporting the final rule.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

Schedule and Milestones:

FY 2022 – FY 2026:

- Develop (FY 2022) and implement annually (FY 2023-2026) a new suite of environmental justice and racial equity indicators, including indicators relied upon by state governments
- Update sea level rise and storm surge indicators (FY 2023), updated annually thereafter
- Initiate development of a national framework for assessing community impacts from species vulnerability to climate change nationally (FY 2023) and implement annually thereafter (FY 2024-2026)
- Conduct training on CSVI indicators with NMFS and Council staff (FY 2023 and annually as part of new Council member training and training for NMFS and Council staff)

Deliverables:

FY 2022 – FY 2026:

- Three new metrics for environmental justice and racial equity (FY 2022), total of six new metrics to be updated annually (FY 2024)
- Six sea level rise and storm surge indicators (FY 2022), updated annually (FY 2023-2026)
- Expanded species climate vulnerability metrics for all regions (FY 2023), updated bi-annually (FY 2025)
- Four trainings in FY 2023, and three trainings per year after (FY 2024–2026)

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(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of environmental justice and racial equity indicators, including those required by state governments (cumulative)					
With Increase	6	8	9	9	9
Without Increase	3	3	3	3	3
Regions with updated community-level storm surge and sea level rise risk indicators					
With Increase	6	6	6	6	6
Without Increase	0	0	0	0	0
Regions with metric that measures community vulnerability to climate vulnerable species					
With Increase	1	2	6	6	6
Without Increase	1	1	1	1	1
Outyear Costs:					
Direct Obligations	1,000	1,000	1,000	1,000	1,000
Capitalized	0	0	0	0	0
Uncapitalized	1,000	1,000	1,000	1,000	1,000
Budget Authority	1,000	1,000	1,000	1,000	1,000
Outlays	620	620	620	620	620
FTE	2	2	2	2	2
Positions	2	2	2	2	2

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Fisheries Science and Management
Subactivity: Fisheries and Ecosystem Science Programs and Services

Title		Grade	Number	Salary	Salaries
Social Scientist		ZP-IV	2	103,690	207,380
Total			2		207,380
Less lapse	-25.00%		0		(51,845)
Total full-time permanent (FTE)			2		155,535
2022 Pay Adjustment (1%)	2.70%				4,199
					159,734

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	2
Part-time permanent	0
Full-time temporary	0
Part-time temporary	0
Total FTE	2
Authorized Positions:	
Full-time permanent	2
Part-time permanent	0
Full-time temporary	0
Part-time temporary	0
Total Positions	2

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Fisheries Science and Management
Subactivity: Fisheries and Ecosystem Science Programs and Services

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	69,044	63,704	67,878	68,038	160
11.3	Other than full-time permanent	591	546	582	582	0
11.5	Other personnel compensation	1,871	1,727	1,840	1,840	0
11.8	Special personnel services payments	23	21	22	22	0
11.9	Total personnel compensation	71,529	65,998	70,322	70,482	160
12	Civilian personnel benefits	24,886	22,962	24,466	24,506	40
13	Benefits for former personnel	26	24	24	24	0
21	Travel and transportation of persons	1,068	985	985	985	0
22	Transportation of things	445	411	411	411	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	2,857	2,636	2,636	2,636	0
23.2	Rental Payments to others	415	383	383	383	0
23.3	Communications, utilities and misc charges	4,403	4,063	4,063	4,063	0
24	Printing and reproduction	158	146	146	146	0
25.1	Advisory and assistance services	11,502	10,613	10,613	10,613	0
25.2	Other services from non-Federal sources	17,272	15,937	15,937	15,937	0
25.3	Other goods and services from Federal sources	833	769	769	769	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	640	640
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	4,264	3,935	3,935	3,935	0
31	Equipment	4,655	4,295	4,295	4,295	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	13,079	12,068	12,068	12,228	160
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	1	1	1	0
44	Refunds	0	0	0	0	0
99	Total obligations	157,393	145,226	151,054	152,054	1,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase/Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Fisheries							
Ecosystem Science	Pos./BA	635	151,054	635	151,254	0	200
Programs and Services	FTE/OBL	506	151,054	506	151,254	0	200

Enterprise Infrastructure Solutions (EIS) (+$200, 0 FTE/0 Positions) – This increase will enable NOAA to conduct a technology modernization and support an accelerated transition of telecommunications services to the GSA EIS contract vehicle. DOC currently uses GSA's Networx, Washington Interagency Telecommunications System 3, and regional contracts to acquire telecommunication services. These contracts expire in May 2023. Between now and then, DOC will be transitioning telecommunications services to the GSA EIS follow-on contract. Additional EIS requests can also be found in Mission Support (MS-65), NOS (NOS-48, NOS-88, NOS-120, and NOS-149), NWS (NWS-24, NWS-127, and NWS-182), NESDIS (NESDIS-37), and OMAO (OMAO-19).

The modernization enables NOAA to re-architect its network infrastructure to gain efficiencies and resilience, realize significantly reduced costs for network services after transition, and minimize risk as legacy services are discontinued. Increased funding will accelerate the transition and enable NOAA to: (a) contract for engineering services to re-architect the network infrastructure and establish detailed transition plans; (b) issue awards for new hardware and telecommunication services; (c) trench and lay new lines, decommission and provision circuits; and (d) establish funding for administrative services to provide ordering, invoice processing, and inventory management. By expediting the technology modernization and migration to the new EIS vendors, NOAA will realize significant reductions in price and cost-avoidance. This funding will reduce risks related to service delivery and operations due to termination of GSA legacy service contracts.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

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Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022 - 2026

- Award NOAA task orders under EIS to support modernization needs
- Establish a sustainable, resilient architecture to meet NOAA's current and planned needs
- Transition 100% NOAA Legacy GSA inventory to EIS

Deliverables:

- Modernized telecommunications infrastructure capable of meeting the agency's mission
- Provide a centralized ordering and management platform
- Provide a secure infrastructure resistant to extreme weather impacts

Performance Measures	2022	2023	2024	2025	2026
Transition of NOAA Telecommunication services to GSA's EIS					
With Increase	35%	60%	80%	100%	0%
Without Increase	20%	45%	55%	65%	75%
	*Assumes full funding of EIS initiatives NOAA-wide				
Outyear Costs:					
Direct Obligations	200	200	200	200	200
Capitalized	0	0	0	0	0
Uncapitalized	200	200	200	200	200
Budget Authority	200	200	200	200	200
Outlays	200	200	200	200	200
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS

(Direct Obligations amounts in thousands)

Activity: Fisheries Science and Management

Subactivity: Fisheries and Ecosystem Science Programs and Services

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	69,044	63,704	67,878	67,878	0
11.3	Other than full-time permanent	591	546	582	582	0
11.5	Other personnel compensation	1,871	1,727	1,840	1,840	0
11.8	Special personnel services payments	23	21	22	22	0
11.9	Total personnel compensation	71,529	65,998	70,322	70,322	0
12	Civilian personnel benefits	24,886	22,962	24,466	24,466	0
13	Benefits for former personnel	26	24	24	24	0
21	Travel and transportation of persons	1,068	985	985	985	0
22	Transportation of things	445	411	411	411	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	2,857	2,636	2,636	2,636	0
23.2	Rental Payments to others	415	383	383	383	0
23.3	Communications, utilities and misc charges	4,403	4,063	4,063	4,063	0
24	Printing and reproduction	158	146	146	146	0
25.1	Advisory and assistance services	11,502	10,613	10,613	10,613	0
25.2	Other services from non-Federal sources	17,272	15,937	15,937	16,137	200
25.3	Other goods and services from Federal sources	833	769	769	769	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	4,264	3,935	3,935	3,935	0
31	Equipment	4,655	4,295	4,295	4,295	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	13,079	12,068	12,068	12,068	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	1	1	1	0
44	Refunds	0	0	0	0	0
99	Total obligations	157,393	145,226	151,054	151,254	200

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Fisheries Data Collections, Surveys, and Assessments	Pos./BA	478	177,599	484	187,599	6	10,000
	FTE/OBL	437	177,599	442	187,599	5	10,000

Climate-Ready Fisheries: Advancing Fisheries Survey Capacity for Commercially and Recreationally Valuable Species (+$10,000, 5 FTE/ 6 Positions) – NMFS will invest $10.0 million in surveys, sampling, and analysis capabilities to better track species that are shifting their distributions due to climate change, while working to restore survey days at sea (DAS) for fish and protected species to levels that were performed in the recent past. Warming oceans, rising seas, decreasing sea ice, increasing ocean acidification, and extreme events (e.g., marine heat waves) are affecting the distribution and abundance of marine species in many regions. These changes impact nearly every aspect of the NMFS' mission, from fisheries management and aquaculture to protected resources conservation and habitat restoration. The pace and scope of change severely impact NMFS' ability to deliver robust stock assessments and identify effective management strategies, putting valuable fisheries and resource-dependent communities and economies at risk.

Funds will support NMFS scientific surveys of living marine resources to improve fishery management, and will focus on regionally-identified survey priorities to meet mandates in the Magnuson-Stevens Act, Marine Mammal Protection Act, and other applicable laws. There is growing demand to expand the spatial extent and ecosystem monitoring capabilities of our surveys to address ocean changes due to climate change, and the subsequent shifting of stocks. Combined with the decline in sea days due to inflationary ship costs, additional investment is needed to ensure NMFS continues to provide the scientific data required to produce accurate and timely management advice from stock assessments in an ecosystem context, as tracked in the Fish Stock Sustainability Index (FSSI). Stock assessments that include robust data facilitate use of the best scientific information available for estimating stock abundance and decreasing uncertainty. This ensures the highest possible sustainable catch limits that maximize the number of fish that can be caught while preventing overfishing.

Funds will primarily be used to acquire survey capacity to increase the geographic extent of surveys and collect more climate and environmental data by purchasing supplemental DAS on NOAA ships and chartered vessels, and by investing in advanced sampling

technologies (e.g., Saildrone, DriX) to augment survey capacity using innovative approaches. Funds will also support survey-related expenses such as seasonal sea-going scientific contractors; supplies and equipment; data management capabilities, and six new positions (one at each of six fisheries science centers) for data analyses and modeling efforts to produce timely stock assessments.

Research is a core capability of NOAA. This request will help NOAA meet the Administration's climate research goals, including EO 14008, and is critical to ensuring NOAA produces research data, tools, and information products that are publically accessible to facilitate climate change decision-making Nation-wide.

Schedule and Milestones:
FY 2022 – FY 2026:

- Restore NMFS fish and protected species survey sea days to approximately 2,200 in FY 2022
- Improve assessment reliability for fish populations experiencing climate-driving distribution shifts through expanding the geographical extent of surveys and better encompassing a stock's range

Deliverables:
FY 2022 – FY 2026:

- Additional 500 days at sea annually through FY 2026 through NOAA ships and expanded use of industry chartered vessels
- Data management, analysis and modeling efforts to produce timely stock assessments through the addition of six new positions, one at each of the NMFS fisheries science centers
- Reduced uncertainty in estimates of stock abundance and better scientific understanding of current and projected marine resources distribution

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Average number of survey sea days					
With Increase	2,199	1,915	1,631	1,347	1,062
Without Increase	1,699	1,415	1,131	847	562
Outyear Costs:					
Direct Obligations	10,000	10,000	10,000	10,000	10,000
Capitalized	0	0	0	0	0
Uncapitalized	10,000	10,000	10,000	10,000	10,000
Budget Authority	10,000	10,000	10,000	10,000	10,000
Outlays	6,200	6,200	6,200	6,200	6,200
FTE	5	6	6	6	6
Positions	6	6	6	6	6

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Fisheries Science and Management
Subactivity: Fisheries Data Collections, Surveys, and Assessments

Title		Grade	Number	Annual Salary	Total Salaries
Fisheries Biologist		ZP-IV	2	100,940	201,880
Fisheries Biologist		ZP-IV	1	102,601	102,601
Fisheries Biologist		ZP-IV	1	95,012	95,012
Fisheries Biologist		ZP-IV	1	103,126	103,126
Fisheries Biologist		ZP-IV	1	98,151	98,151
Total			6		600,770
Less lapse	25.00%		(1)		(150,193)
Total full-time permanent (FTE)			5		450,578
2022 Pay Adjustment (1%)	2.70%				12,166
					462,744

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	5
Part-time permanent	0
Full-time temporary	0
Part-time temporary	0
Total FTE	5
Authorized Positions:	
Full-time permanent	6
Part-time permanent	0
Full-time temporary	0
Part-time temporary	0
Total Positions	6

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Fisheries Science and Management
Subactivity: Fisheries Data Collections, Surveys, and Assessments

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	47,596	46,780	50,275	50,738	463
11.3	Other than full-time permanent	443	436	468	468	0
11.5	Other personnel compensation	816	802	861	861	0
11.8	Special personnel services payments	1,546	1,520	0	0	0
11.9	Total personnel compensation	50,401	49,538	51,604	52,067	463
12	Civilian personnel benefits	17,670	17,366	18,638	18,754	116
13	Benefits for former personnel	5	5	5	5	0
21	Travel and transportation of persons	987	970	970	970	0
22	Transportation of things	362	355	355	355	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	2,916	2,866	2,866	2,866	0
23.2	Rental Payments to others	239	235	235	235	0
23.3	Communications, utilities and misc charges	3,885	3,818	3,818	3,818	0
24	Printing and reproduction	161	158	158	158	0
25.1	Advisory and assistance services	14,202	13,959	13,959	13,959	0
25.2	Other services from non-Federal sources	18,368	18,053	18,053	25,353	7,300
25.3	Other goods and services from Federal sources	466	458	458	1,589	1,131
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	4,230	4,158	4,158	5,148	990
31	Equipment	1,854	1,822	1,822	1,822	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	61,551	60,495	60,495	60,495	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	5	5	5	5	0
44	Refunds	0	0	0	0	0
99	Total obligations	177,302	174,261	177,599	187,599	10,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase/Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Fisheries Data Collections, Surveys, and Assessments	Pos./BA	478	177,599	493	185,979	15	8,380
	FTE/OBL	437	177,599	448	185,979	11	8,380

Wind Energy: Scientific Survey Mitigation (+$8,380, 11 FTE/15 Positions) – This request will begin a program to mitigate the effects of planned offshore energy activities on NMFS scientific surveys. Offshore wind development is rapidly expanding in the Northeast and Mid-Atlantic, as well as other areas of the United States, such as the West Coast, and represents a new use of our marine waters requiring substantial scientific and regulatory review. NMFS will work with the Bureau of Ocean Energy Management (BOEM) to minimize the effects of offshore energy projects on fisheries, and important habitats in the region; reduce delays and minimize adverse economic impacts to the fishing industry and related coastal communities; and mitigate impacts to fisheries surveys in the Northeast and Mid-Atlantic. NOAA is requesting a total of $20.4 million in four complementary areas to address the rapid expansion and the impacts of offshore energy projects. The other components can be found in the following PPAs: Marine Mammals, Sea Turtles, and Other Species (see page NMFS-19); Fisheries Ecosystem Science Programs and Services (see page NMFS-54); and Fisheries Management Programs and Services (see page NMFS-86).

NMFS requests $8.4 million to begin implementing a Federal survey mitigation program that will need to occur over the operational lifespan of offshore wind developments (33+ years). Offshore wind development will have significant adverse impacts on NMFS scientific surveys because NOAA aircraft and vessels will not be able to safely operate within wind energy areas following our current survey designs and protocols. New survey designs and methods will also be required to address the anticipated changes in habitats in and around offshore wind developments. The cumulative effects of additional wind energy development throughout the Northeast U.S. Continental Shelf Ecosystem will magnify adverse project-specific impacts on NMFS surveys. The six elements of NMFS' Federal Survey Mitigation Program include: 1) Evaluate survey designs, 2) Identify and develop new survey approaches, 3) Calibrate new survey approaches, 4) Develop interim provisional survey indices, 5) Conduct wind energy monitoring to fill regional scientific survey data needs over the life of offshore wind operations, and 6) Develop and communicate new regional data streams. The requested level of funding is an initial investment that will enable NMFS to begin the first year of implementing a multi-year Federal survey mitigation program by advancing elements 1, 2, 4, and 6 for seven out of the 11 core scientific surveys that will be disrupted

by offshore wind energy development (NEFSC Spring and Autumn Bottom Trawl Survey, Ecosystem Monitoring Survey, Scallop Survey, Atlantic Surfclam and Ocean Quahog Surveys, North Atlantic right whale aerial survey, and marine mammal and sea turtle ship-based and aerial surveys).

NOAA's expertise in managing ocean species and habitats is critical to supporting the Administration's priority of deploying 30 gigawatts of offshore wind by 2030, by facilitating responsible renewable energy development while protecting ecosystems.

Schedule and Milestones:
FY 2022 – FY 2026

- Advance management's understanding of and science-based evidence for the interactions of protected species and their habitats and fisheries with offshore wind energy.
- Establish and support regional collaborative ecosystem-scale research and monitoring programs across project/ecosystem scales to develop the necessary understanding of fisheries, habitat, and protected species interactions with wind development and the associated cumulative impacts to these resources and the habitats and ecosystems on which they rely, including potential changes in oceanographic conditions.
- Complete elements 1, 2, and 4 of a Federal Survey Mitigation Program, as described in the Vineyard Wind Final Environmental Impact Statement for seven core NEFSC fisheries and protected species surveys.

Deliverables:
FY 2022- FY 2026

- Scientific manuscripts for publication in peer-reviewed journals to aid in establishing NMFS as a global leader on topics related to offshore wind and fisheries science.
- Regional scientific frameworks for (1) fisheries research and monitoring, and (2) protected species and wildlife research and monitoring, that are integrated into a Federal survey mitigation program.
- Scientific survey adaptation plans and scientific recommendations to mitigate impacts to the NEFSC Spring and Autumn Bottom Trawl Survey, Ecosystem Monitoring Survey, Scallop Survey, Atlantic Surfclam and Ocean Quahog Surveys, North Atlantic right whale aerial survey, and marine mammal and sea turtle ship-based and aerial surveys (FY 2022, 2023, 2024)
- One additional survey indices time series with existing NEFSC data to bridge the period of uncertainty created by the transition in survey methods (FY 2023)
- One calibration experiment to ensure continuity of core survey time series (FY 2025)

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of core Federal scientific surveys for which survey mitigation plans have been developed to assure the continuity of critical scientific time series.					
With Increase	1	2	2	2	0*
Without Increase	0	0	0	0	0

**The requested increase is sufficient to cover 7 out of 11 surveys. With this funding, NMFS may be able to begin work on the remaining 4 surveys, but will not have them in place.*

Outyear Costs:					
Direct Obligations	8,380	8,380	8,380	8,380	8,380
Capitalized	0	0	0	0	0
Uncapitalized	8,380	8,380	8,380	8,380	8,380
Budget Authority	8,380	8,380	8,380	8,380	8,380
Outlays	5,196	5,196	5,196	5,196	5,196
FTE	11	15	15	15	15
Positions	15	15	15	15	15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Fisheries Science and Management
Subactivity: Fisheries Data Collections, Surveys, and Assessments

Title		Grade	Number	Annual Salary	Total Salaries
Fisheries Biologist		ZP-III	10	71,987	719,870
Fisheries Biologist		ZP-II	5	48,641	243,205
Total			15		963,075
Less lapse	25.00%		(4)		(240,769)
Total full-time permanent (FTE)			11		722,306
2022 Pay Adjustment (2.7%)					19,502
					741,808

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	11
Total FTE	11
Authorized Positions:	
Full-time permanent	15
Total Positions	15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Fisheries Science and Management
Subactivity: Fisheries Data Collections, Surveys, and Assessments

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	47,596	46,780	50,275	51,016	741
11.3	Other than full-time permanent	443	436	468	468	0
11.5	Other personnel compensation	816	802	861	861	0
11.7	Military personnel compensation	1,546	1,520	0	0	0
11.9	Total personnel compensation	50,401	49,538	51,604	52,345	741
12	Civilian personnel benefits	17,670	17,366	18,638	18,823	185
13	Benefits for former personnel	5	5	5	5	0
21	Travel and transportation of persons	987	970	970	1,128	158
22	Transportation of things	362	355	355	355	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	2,916	2,866	2,866	3,006	140
23.2	Rental Payments to others	239	235	235	235	0
23.3	Communications, utilities and misc charges	3,885	3,818	3,818	3,818	0
24	Printing and reproduction	161	158	158	158	0
25.1	Advisory and assistance services	14,202	13,959	13,959	13,959	0
25.2	Other services from non-Federal sources	18,368	18,053	18,053	24,701	6,648
25.3	Other goods and services from Federal sources	466	458	458	458	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	4,230	4,158	4,158	4,172	14
31	Equipment	1,854	1,822	1,822	1,876	54
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	61,551	60,495	60,495	60,935	440
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	5	5	5	5	0
44	Refunds	0	0	0	0	0
99	Total obligations	177,302	174,261	177,599	185,979	8,380

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM DECREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Observers & Training	Pos./BA	158	56,052	158	52,604	0	(3,448)
	FTE/OBL	110	56,052	110	52,604	0	(3,448)

Northeast Multispecies Fishery (-$3,448, 0 FTE/0 Positions) – NMFS requests $6.9 million for the Northeast At-Sea Monitoring Program (ASM) in FY 2022. The FY 2021 appropriations provided $10.3 million to fully fund the cost of ASM in the New England groundfish fishery, including at-sea and shoreside infrastructure costs. NOAA will cover all industry costs for at-sea monitoring and data processing in fishing year 2021 (May 1, 2021, through April 30, 2022). Funds will also be used to support at-sea monitor training and equipment, process samples, and continue development of electronic monitoring technologies that may reduce costs of or improve at-sea monitoring in the future. The $6.9 million requested will allow NMFS to fully fund industry and NOAA ASM costs for fishing year 2022.

	2022	2023	2024	2025	2026
Outyear Costs:					
Direct Obligations	(3,448)	(3,448)	(3,448)	(3,448)	(3,448)
Capitalized	0	0	0	0	0
Uncapitalized	(3,448)	(3,448)	(3,448)	(3,448)	(3,448)
Budget Authority	(3,448)	(3,448)	(3,448)	(3,448)	(3,448)
Outlays	(2,138)	(2,138)	(2,138)	(2,138)	(2,138)
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Fisheries Science and Management
Subactivity: Observers and Training

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Decrease from 2022 Base
11.1	Full-time permanent compensation	12,806	12,253	13,047	13,047	0
11.3	Other than full-time permanent	95	90	96	96	0
11.5	Other personnel compensation	266	254	270	270	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	13,167	12,597	13,413	13,413	0
12	Civilian personnel benefits	4,849	4,637	4,937	4,937	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	221	211	211	211	0
22	Transportation of things	134	128	128	128	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	1,373	1,313	1,313	1,313	0
23.2	Rental Payments to others	4	3	3	3	0
23.3	Communications, utilities and misc charges	334	320	320	320	0
24	Printing and reproduction	36	34	34	34	0
25.1	Advisory and assistance services	1,189	1,137	1,137	1,137	0
25.2	Other services from non-Federal sources	34,748	33,236	33,236	29,788	(3,448)
25.3	Other goods and services from Federal sources	58	55	55	55	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	460	440	440	440	0
31	Equipment	293	280	280	280	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	570	545	545	545	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	57,436	54,936	56,052	52,604	(3,448)

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Fisheries Management Programs and Services	Pos./BA	471	127,331	495	132,486	24	5,155
	FTE/OBL	434	127,331	452	132,486	18	5,155

Wind Energy: Fisheries Management (+$5,155, 18 FTE/24 Positions) – This request will assess the effects of planned offshore energy activities on fisheries environmental reviews including Essential Fish Habitat (EFH) consultations under the MSA and review of environmental impact statements (EIS) analyzing the impacts to living marine resources and affected communities under the National Environmental Policy Act (NEPA). Offshore wind development is rapidly expanding in the Northeast and Mid-Atlantic, as well as other areas of the United States, such as the West Coast, and represents a new use of our marine waters requiring substantial scientific and regulatory review. NMFS will work with the Bureau of Ocean Energy Management (BOEM) to minimize the effects of offshore energy projects on protected resources, fisheries, and important habitats in the region; reduce delays and minimize adverse economic impacts to the fishing industry and related coastal communities; and mitigate impacts to fisheries surveys in the Northeast and Mid-Atlantic. NOAA is requesting a total of $20.4 million in four complementary areas to address the rapid expansion and the impacts of offshore energy projects. The other components can be found in the following PPAs: Marine Mammals, Sea Turtles, and Other Species (see page NMFS-19); Fisheries Ecosystem Science Programs and Services (see page NMFS-54); and Fisheries Data Collections, Surveys, and Assessments (see page NMFS-79).

NMFS requests $5.2 million to efficiently and effectively carry out increased consultation work associated with new BOEM activities with opportunities for early engagement with BOEM and project proponents, and to minimize impacts and delays to existing workload carried by existing consultation biologists. The funding supports the staff needed to review environmental assessments for wind projects that enable NMFS to conduct EFH consultations on offshore wind projects and provide conservation recommendations to mitigate the impacts to complex and important marine habitats. In addition, it supports the review of comprehensive and complex EIS to ensure that BOEM considers reasonable alternatives with sufficient analysis to assess the impacts to living marine resources and socio-economic impacts to affected fishing and coastal communities. Both tasks routinely require dedicated engagement with BOEM staff and contractors to ensure the analyses are sufficient to allow for NMFS' assessment and consultation as a cooperating agency.

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

NOAA's expertise in managing ocean species and habitats is critical to supporting the Administration's priority of deploying 30 gigawatts of offshore wind by 2030, by facilitating responsible renewable energy development while protecting ecosystems.

Schedule and Milestones:
FY 2022 – FY 2026

- Consistent with the Administration's goal of achieving the capacity to generate 30 GW of offshore wind power by 2030, provide information, expert advice, and guidance to BOEM to implement offshore wind development for approximately 20 to 30 projects over a four to five year period beginning in FY 2022 that considers impacts to:
    - Socio-economic impacts from offshore wind development; and,
    - Essential fish habitats, with particular focus on vulnerable complex habitats and life stages.
- Through our role as a Cooperating Agency under NEPA, identify and share living marine resources expertise and make recommendations upon potential environmental, biological, and socio-economic impacts on our trust resources on approximately 20 to 30 projects over a four to five year period by 2026. This will allow regulators and developers to consider the full scope of impacts.
- Complete thorough and timely EFH consultations that are based on the best available scientific information while fulfilling FAST-41[9] obligations.

Deliverables:
FY 2022- FY 2026

- Conduct NEPA reviews of the direct, indirect, short-term, long-term, and cumulative impacts to essential fish habitats and resource users and associated communities.
- Provide input on project milestones and timelines, Draft Environmental Impact Statements, Final Environmental Impact Statements, and Records of Decision structure, content, and appropriate methodology for impact analysis to BOEM to improve document quality.
- Establish a national Wind Center of Excellence to coordinate the review of wind projects nationwide.

[9] P.L. 114-94 Title 41, Fixing America's Surface Transportation Act

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(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Reducing uncertainty of wind and fisheries impacts within regulatory reviewing process – Number of independent peer reviewed literature documenting the effects and impacts of offshore wind development on fisheries and protected species recovery and conservation					
With Increase	2	3	4	4	5
Without Increase	0	0	0	0	0
The number of wind energy projects where early and comprehensive coordination with BOEM and industry yields sufficient information and analysis to inform NMFS consultations and reviews, resulting in improved protection of NOAA Trust Resources					
With Increase	20	20	22	21	24
Without Increase	6	4	5	4	4
Outyear Costs:					
Direct Obligations	5,155	5,155	5,155	5,155	5,155
Capitalized	0	0	0	0	0
Uncapitalized	5,155	5,155	5,155	5,155	5,155
Budget Authority	5,155	5,155	5,155	5,155	5,155
Outlays	3,196	3,196	3,196	3,196	3,196
FTE	18	24	24	24	24
Positions	24	24	24	24	24

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Fisheries Science and Management
Subactivity: Fisheries Management Programs and Services

Title		Grade	Number	Annual Salary	Total Salaries
Fisheries Biologist		ZP-III	18	71,987	1,295,766
Fisheries Biologist		ZP-III	1	70,821	70,821
Fisheries Biologist		ZP-II	5	48,641	243,205
Total			24		1,609,792
Less lapse	25.00%		(6)		(402,448)
Total full-time permanent (FTE)			18		1,207,344
2022 Pay Adjustment (2.7%)					32,598
					1,239,942

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	18
Total FTE	18
Authorized Positions:	
Full-time permanent	24
Total Positions	24

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Fisheries Science and Management
Subactivity: Fisheries Management Programs and Services

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	49,081	47,767	51,185	52,425	1,240
11.3	Other than full-time permanent	269	262	281	281	0
11.5	Other personnel compensation	895	871	933	933	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	50,245	48,900	52,399	53,639	1,240
12	Civilian personnel benefits	18,549	18,052	19,344	19,654	310
13	Benefits for former personnel	2	2	2	2	0
21	Travel and transportation of persons	1,100	1,071	1,071	1,206	135
22	Transportation of things	42	41	41	41	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	1,598	1,555	1,555	1,658	103
23.2	Rental Payments to others	1,008	981	981	981	0
23.3	Communications, utilities and misc charges	565	550	550	550	0
24	Printing and reproduction	153	149	149	149	0
25.1	Advisory and assistance services	7,719	7,512	7,512	7,512	0
25.2	Other services from non-Federal sources	24,616	23,957	23,957	27,271	3,314
25.3	Other goods and services from Federal sources	1,010	983	983	983	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	680	661	661	662	1
31	Equipment	728	708	708	760	52
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	17,897	17,418	17,418	17,418	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	125,912	122,540	127,331	132,486	5,155

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Fisheries Management Programs and Services	Pos./BA	471	127,331	471	129,331	0	2,000
	FTE/OBL	434	127,331	434	129,331	0	2,000

Education and Outreach for Diverse Participation in Regulatory and Science Process (+$2,000, 0 FTE/0 Positions) – This request will support stronger fishing and seafood sectors by implementing training programs to provide constituents the information and tools needed to confidently and productively engage in fishery (commercial, recreational, aquaculture) management decision processes. Very few new constituents participate in the fishery management process and many who do not participate lack an understanding of the process. Yet strong fishing and seafood sectors require robust engagement with diverse communities that are familiar with the regulations and science that underpin NMFS' activities. By targeting outreach to underserved and underrepresented communities, we will provide these training opportunities to a more diverse group of new participants, allowing them to better understand the scientific underpinnings and the public processes for regulatory actions. The training will benefit both the agency and stakeholders by improving cooperation and trust among the industry, public, scientists, and regulators. These funds will enable NMFS to build stronger and more equitable fishing and seafood sectors to create jobs, support critical infrastructure, and strengthen community economic resiliency. The request complements a $1.0 million request entitled "Workforce Training to Support the Seafood Industry" (see page NMFS-95).

Requested funds will support three complementary efforts:

- NMFS will enroll a group of experts to examine the breadth and depth of diversity and inclusion issues facing NMFS and the fishing and seafood sectors and to provide recommendations for moving forward.

- Building on the panel's recommendations, NMFS will fund partnerships through competitive grants and/or cooperative agreements to bring together diverse stakeholders with scientists, managers, and other marine resource professionals to learn about NMFS' regulatory and science processes in a neutral and professional setting. Modeled after the highly successful Marine

Resource Education Program (MREP), participants will leave the program empowered and better prepared to be a voice in Federal fisheries management. The MREP experience enables fishermen and other fishery stakeholders to participate productively in the fisheries management process and leads to improved cooperation and trust between state and Federal stakeholders including fishermen, scientists, and managers. A co-learning approach is fundamental to program delivery, where fishermen and industry participants, and expert science and management presenters learn from one another in an inclusive and unbiased environment outside of the regulatory process. Program design encourages unscripted interactions to occur organically and fosters constructive dialogue. The opportunity exists to partner with the Gulf of Maine Research Institute (GMRI), which currently runs MREP, and assist with tailoring their workshops for specific diverse and underrepresented communities such as tribal and non-English speaking communities.

- NMFS will also support 5-10 fisheries education/training pilot programs in partnership with the private and public sector and academic institutions targeting diverse and underserved communities, including but not limited to: Historically Black Colleges and Universities (HBCUs), minority-serving institutions (MSIs), and tribal and community colleges. Training curriculum will include broad aspects of fisheries science and management. These pilots will help gauge the effectiveness of various efforts before targeted future investments into the 2-3 programs that show the greatest potential for longer-term effectiveness.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

Schedule and Milestones:
FY 2022 – FY 2026

- Create/identify panel of experts to guide program development and identify barriers to participation (FY 2022)
- Provide grants to execute science and management training targeted for underserved communities (FY 2023- FY 2026)
- Pilot Projects
    - 5 -10 pilots established (FY 2023)
    - 2-3 training partnerships in place (FY 2024-2026)

Deliverables:

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

FY 2022- FY 2026

- Strategic Training and Implementation Plan Developed (FY 2022)
- 5-10 pilots established and complete first science and management training (FY 2023)
- 2-3 training partnerships in place (FY 2024-2026)

Performance Measures	2022	2023	2024	2025	2026
Number of Completed Trainings					
With Increase	0	2	4	4	6
Without Increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	2,000	2,000	2,000	2,000	2,000
Capitalized	0	0	0	0	0
Uncapitalized	2,000	2,000	2,000	2,000	2,000
Budget Authority	2,000	2,000	2,000	2,000	2,000
Outlays	1,240	1,240	1,240	1,240	1,240
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Fisheries Science and Management
Subactivity: Fisheries Management Programs and Services

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	49,081	47,767	51,185	51,185	0
11.3	Other than full-time permanent	269	262	281	281	0
11.5	Other personnel compensation	895	871	933	933	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	50,245	48,900	52,399	52,399	0
12	Civilian personnel benefits	18,549	18,052	19,344	19,344	0
13	Benefits for former personnel	2	2	2	2	0
21	Travel and transportation of persons	1,100	1,071	1,071	1,071	0
22	Transportation of things	42	41	41	41	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	1,598	1,555	1,555	1,555	0
23.2	Rental Payments to others	1,008	981	981	981	0
23.3	Communications, utilities and misc charges	565	550	550	550	0
24	Printing and reproduction	153	149	149	149	0
25.1	Advisory and assistance services	7,719	7,512	7,512	7,512	0
25.2	Other services from non-Federal sources	24,616	23,957	23,957	24,157	200
25.3	Other goods and services from Federal sources	1,010	983	983	983	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	680	661	661	661	0
31	Equipment	728	708	708	708	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	17,897	17,418	17,418	19,218	1,800
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	125,912	122,540	127,331	129,331	2,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Fisheries Management Programs and Services	Pos./BA	471	127,331	471	128,331	0	1,000
	FTE/OBL	434	127,331	434	128,331	0	1,000

Workforce Training to Support the Seafood Industry (+$1,000, 0 FTE/0 Positions) – NMFS will implement a series of workforce development and training pilot projects and grants, focused on environmental justice and equity, to support a more robust and diverse domestic seafood sector. The COVID-19 crisis has caused substantial economic disruption to many segments of the seafood and fishing industry—the shutdown of restaurants, slowdown and changes in retail sales and exports, and disruptions to processing facilities and supply chains. Addressing these challenges through workforce training offers opportunities to build a stronger seafood sector that will create new jobs, improve working infrastructure, and strengthen community economic resiliency, while supporting a diverse, equitable, and inclusive workforce that can enhance innovation in the industry. This request complements a $2.0 million request entitled "Education and Outreach for Diverse Participation in Regulatory and Science Process" (see page NMFS-91).

The requested funds will support 5-10 one-year pilot programs for workforce development and training efforts through partnerships with entities catering to diverse and historically underserved communities, including but not limited to: minority serving institutions (MSIs), Historically Black Colleges and Universities (HBCUs), tribal colleges, and community colleges. The results of these pilots will help identify and inform areas for future, more focused investment in a subset (1-3) of pilots that showed the most potential to have longer-term impact. NMFS will coordinate with the National Sea Grant College Program to provide training to the seafood, fishing, and aquaculture industries to be better prepared to adapt to disruptions in the market.

Specific focus areas for grants will be developed with our partners and will include:

(1) technical and engineering skills for the seafood sector (e.g., hatchery techniques, fishing and vessel skills, recirculating aquaculture systems, seafood handling and processing);

(2) seafood safety and Hazard Analysis Critical Control Point (HACCP);
(3) innovative and value-added processing capacity (e.g., freezing and methods to create shelf-stable products for retail sale);
(4) business planning and management;
(5) communication and marketing methods (including online and direct marketing tools where appropriate); and
(6) training related to recreational fishing business opportunities.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

Schedule and Milestones:
FY 2022 – FY 2026:

- Evaluate potential education opportunities for the seafood sector, focusing on providing access to underserved and vulnerable communities adversely impacted by the pandemic
- Support 5 to 10 one-year pilot programs to train prospective participants in the seafood industry workforce in close collaboration with Sea Grant
- Review, evaluate, and assess performance using a series of socio-economic metrics—composition of incoming participants, rate of program completion, types of employment opportunities secured post-training, etc.
- Conduct selection process to identify one to three pilot programs for additional funding

Deliverables:
FY 2022 – FY 2026:

- Five to 10 one-year pilot programs established and implemented (FY 2022)
- One to three pilot programs selected for additional funding based on performance evaluation (FY 2023-FY 2026)

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Workforce Development Program Graduates					
With Increase	0	40	60	60	60
Without Increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	1,000	1,000	1,000	1,000	1,000
Capitalized	0	0	0	0	0
Uncapitalized	1,000	1,000	1,000	1,000	1,000
Budget Authority	1,000	1,000	1,000	1,000	1,000
Outlays	620	620	620	620	620
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS

(Direct Obligations amounts in thousands)

Activity: Fisheries Science and Management

Subactivity: Fisheries Management Programs and Services

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	49,081	47,767	51,185	51,185	0
11.3	Other than full-time permanent	269	262	281	281	0
11.5	Other personnel compensation	895	871	933	933	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	50,245	48,900	52,399	52,399	0
12	Civilian personnel benefits	18,549	18,052	19,344	19,344	0
13	Benefits for former personnel	2	2	2	2	0
21	Travel and transportation of persons	1,100	1,071	1,071	1,071	0
22	Transportation of things	42	41	41	41	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	1,598	1,555	1,555	1,555	0
23.2	Rental Payments to others	1,008	981	981	981	0
23.3	Communications, utilities and misc charges	565	550	550	550	0
24	Printing and reproduction	153	149	149	149	0
25.1	Advisory and assistance services	7,719	7,512	7,512	7,512	0
25.2	Other services from non-Federal sources	24,616	23,957	23,957	23,957	0
25.3	Other goods and services from Federal sources	1,010	983	983	983	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	680	661	661	661	0
31	Equipment	728	708	708	708	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	17,897	17,418	17,418	18,418	1,000
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	125,912	122,540	127,331	128,331	1,000

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Enforcement

Goal Statement

NOAA's Office of Law Enforcement (OLE) strengthens domestic commerce by enforcing NOAA's natural resource protection laws and promoting compliance with Federal regulations to conserve and protect our Nation's living marine resources and their natural habitat.

Base Program

OLE protects and monitors the world's largest EEZ, including 13 National Marine Sanctuaries and five Marine National Monuments (Figure 1), and is the only enforcement program (Federal or state) exclusively dedicated to Federal fisheries and marine resource enforcement. An overview can be found at https://www.fisheries.noaa.gov/about/office-law-enforcement and https://www.fisheries.noaa.gov/topic/enforcement. OLE provides direct support for enforcement activities in the NMFS headquarters' Offices of Sustainable Fisheries and Protected Resources, NMFS Regional Offices, and the NOS Office of National Marine Sanctuaries.

Figure 1. NOAA OLE Jurisdiction

OLE supports critical collaborations and leverages 26 Joint Enforcement Agreements (JEAs) with 27 coastal states and territories, and partnerships with other Federal agencies such as the U.S. Coast Guard. OLE refers enforcement cases that document violations to NOAA's Office of General Counsel or the U.S. Department of Justice for review and potential prosecution.

NOAA cannot meet the mandate to end overfishing without OLE's efforts. These efforts ensure that the millions of people who enjoy and rely on these marine resources understand and comply with the regulations necessary to ensure their sustainability and allow fair competition now and for future generations. OLE supports two objectives:

1. Enforce laws and regulations that govern:
    a. commercial and recreational fisheries,
    b. international and interstate commerce in marine resources, and
    c. human interactions with marine mammals and threatened and endangered species.
2. Protect resources within designated sanctuaries, marine monuments, and protected areas.

To address these mission requirements, OLE implements four primary methods:

1. Traditional enforcement such as investigations and patrols,
2. Partnerships with state and Federal agencies,
3. Technological tools such as Vessel Monitoring Systems, and
4. Outreach and education strategies designed to increase and enhance voluntary compliance with environmental laws and regulations.

Statement of Operating Objectives

Schedule and Milestones:

FY 2022 – FY 2026:

- Continue to advance enforcement and compliance assistance efforts in support of NOAA's OLE Operational Priorities
- Continue with the hiring, training and deployment of enforcement personnel at strategic Ports of Entry
- Ensure consistent international IUU fishing enforcement training and technical assistance

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Deliverables:
FY 2022 – FY 2026:

- Monitoring of and compliance assistance to approximately 4,450 vessels under the Vessel Monitoring System (VMS) requirements of 23 Fishery Management Plans (FMPs), two international convention areas, and the Papahanaumokuakea National Monument
- Review of progress toward current and determination of next set of strategic five-year national and regional Operational Enforcement Priorities

Explanation and Justification

Comparison by subactivity		2020 Actual Personnel	2020 Actual Amount	2021 Enacted Personnel	2021 Enacted Amount	2022 Base Personnel	2022 Base Amount
Enforcement	Pos/BA	232	74,670	257	74,278	257	77,009
	FTE/OBL	213	81,924	214	74,278	214	77,009
Total Enforcement	Pos/BA	232	74,670	257	74,278	257	77,009
	FTE/OBL	213	81,924	214	74,278	214	77,009

The following programs and activities are funded by the Enforcement budget line:

Enforcement and Surveillance:
NOAA special agents and enforcement officers work to deter, detect, investigate, and document any violations of Federal marine natural resource laws and regulations. NOAA's approach to fisheries enforcement emphasizes compliance assistance. OLE assists regulated parties in understanding and complying with fishery regulations through contact during monitoring and inspections, and increases public awareness and understanding of enforcement goals and objectives through participation in community meetings, trade shows, and on-the-dock informational visits. This approach has proven effective in maintaining dialog on often complex regulations, and allows NOAA's investigative efforts and subsequent prosecution to focus on cases that go beyond misunderstandings and/or clerical errors.

This program responds to inquiries and requests for assistance from a variety of industry and public stakeholders, covering a broad range of issues related to fisheries, marine mammals, and endangered and other protected marine species. In recent years, additional investments in the Enforcement Program have been made to strengthen NOAA's efforts to detect and deter Illegal, Unreported and Unregulated (IUU) fishing and enforce restrictions on imports of illegally-harvested and improperly-documented seafood.

Cooperative Agreements with States:
The Cooperative Enforcement Program leverages the resources of coastal state and U.S. territorial marine conservation law enforcement agencies to provide direct support for the Federal enforcement mission. These partners execute Joint Enforcement Agreements (JEA) with NOAA to support Federal enforcement efforts near shore and at sea, as well as provide land-based monitoring and inspection activities. This approach addresses challenges associated with the geographic jurisdiction, the breadth of laws and regulations within NOAA's stewardship responsibilities, the amount of regulated commercial activity (fishing and both domestic and international trade), and the amount of recreational use of the marine environment. This cooperative program allows OLE to concentrate on the investigation and resolution of more serious violations by integrating monitoring and inspection activities for Federal requirements with the work of state/territorial enforcement partners and the U.S. Coast Guard. More information on the program can be found at https://www.fisheries.noaa.gov/topic/enforcement#cooperative-enforcement.

Technology and Domain Awareness:
OLE utilizes current and emerging technologies to enhance and maximize operational capabilities and effectiveness. The development, use, support, and management of these technologies is essential. One of the current technologies utilized is the Vessel Monitoring System (VMS). VMS is a satellite or cellular-based technology program for remote monitoring of fishing vessels at sea. VMS is a cost-effective way to help enforce protected areas, fishing quotas, actual landings, and several Federal natural resource, environmental, and species conservation laws. OLE also utilizes digital and marine forensics capabilities to collect, process and analyze evidence, and employs other technologies in its efforts to promote compliance with, and investigate violations of, regulated activities.

Implementation of the High Seas Driftnet Fisheries Enforcement Act:
The High Seas Driftnet Fisheries Enforcement Act sets U.S. policy to enforce the United Nations' worldwide moratorium on large-scale driftnet fishing beyond the EEZ of any nation. Renegade large-scale high seas driftnet fishing indiscriminately kills massive amounts of fish and other marine life such as whales and turtles with enormous nets suspended for miles in open water. The practice

is universally condemned because it is a significant threat to ocean ecosystems and to the food and economic security of nations that rely on fishery resources. The Act provides for denial of port privileges to and import sanctions against nations whose vessels and/or nationals are determined to be conducting illegal driftnet activities and who do not take corrective action. With these funds, OLE conducts investigation and enforcement required to prosecute and deter these illegal actions. Additionally, NOAA participates in scientific research as part of a multi-national cooperative marine ecosystem research program on driftnet-affected species. The results of this research reduce uncertainty in population assessments for these species and inform related fishery management and enforcement decisions.

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(Dollar amounts in thousands)

Activity: Habitat Conservation and Restoration

Goal Statement

The Office of Habitat Conservation protects and restores habitat to sustain fisheries, recover protected species, and maintain resilient coastal ecosystems and communities.

Base Program

Activities within the Habitat Conservation and Restoration activity focus on three program areas including Sustainable Habitat Management, Fisheries Habitat Restoration, and Chesapeake Bay Protection and Restoration. The Magnuson-Stevens Fishery Conservation and Management Act (MSA), Federal Power Act, Energy Policy Act of 2005; Endangered Species Act; Oil Pollution Act; and Comprehensive Environmental Response, Compensation and Liability Act guide many of our efforts. NOAA works strategically across programs and with partner organizations toward shared goals to address the growing challenge of coastal and marine habitat loss and degradation. (see https://www.fisheries.noaa.gov/insight/habitat-heroes-some-our-partners-habitat-conservation for additional information on our partners.)

Through NOAA's Habitat Blueprint (https://www.habitatblueprint.noaa.gov/), NOAA and partners collaborate to increase the effectiveness of our habitat conservation efforts for the benefit of fisheries, coastal and marine life, and the coastal communities and economies they support.

Additional information on NMFS habitat conservation can be found at https://www.fisheries.noaa.gov/topic/habitat-conservation.

Statement of Operating Objectives

Schedule and Milestones:
FY 2022 – FY 2026:

- Develop management options for protecting deep-sea corals in partnership with the Regional Fishery Management Councils and National Marine Sanctuaries
- Participate in the re-licensing process for an estimated 125 hydroelectric projects

- Identify and protect essential fish habitat through consultations and partnerships
- Develop restoration plans, conduct habitat assessments, and implement priority restoration projects critical for NOAA trust resources
- Contribute to major ecosystem restoration efforts, including Chesapeake Bay, Puget Sound, Gulf of Mexico, Great Lakes, and San Francisco Bay/Delta

Deliverables:
FY 2022 – FY 2026:

- Accurate deep-sea coral habitat distribution maps that allow managers to better protect these biologically rich ecosystems
- Technical guidance and assistance provided to NOAA partners, Federal action agencies, and resource decision-makers to achieve protection and restoration of NOAA trust resources
- Restoration plans reviewed and approved through NRDA public process
- Development of maps and habitat assessments annually to support oyster restoration in the Chesapeake Bay
- Acres of habitat restored for ocean, coastal, and Great Lakes resources
- Stream miles made accessible for ocean, coastal, and Great Lakes resources

Explanation and Justification

		2020 Actual		2021 Enacted		2022 Base Program	
Comparison by subactivity		Personnel	Amount	Personnel	Amount	Personnel	Amount
Habitat Conservation and Restoration	Pos/BA	172	56,637	185	57,053	185	59,132
	FTE/OBL	177	57,320	179	57,053	179	59,132
Total Habitat Conservation and Restoration	Pos/BA	172	56,637	185	57,053	185	59,132
	FTE/OBL	177	57,320	179	57,053	179	59,132

Healthy habitat provides significant and essential ecosystem, community, and economic benefits. Habitat is the foundation for resilient fisheries and fishing-based communities and industries, as well as key to supporting and recovering endangered and

threatened species. In 2016, the U.S. commercial and recreational saltwater fishing industries generated more than $212 billion in sales and supported 1.7 million jobs.[10]

Coastal communities rely on healthy habitat for a wide variety of additional socio-economic needs including, recreation, tourism, and natural infrastructure that protects life and property by reducing effects of storm damage, erosion, and coastal flooding. (https://www.fisheries.noaa.gov/national/habitat-conservation/value-habitat) The Nation's ocean and coastal resources annually provide non-market value (e.g. storm surge protection, wildlife viewing, beach visits, snorkeling) of over $100 billion.[11]

However, we are facing continued widespread loss and deterioration of vital habitats for managed fisheries, as well as threatened and endangered species. For example, we are losing coastal wetlands – prime nurseries for many species – at the rate of about 80,000 acres per year. (https://www.fisheries.noaa.gov/coastal-wetlands-too-valuable-lose) This rate of loss is 20,000 more acres per year than was lost during the 6-year period of 1998– 2004.[12] NOAA is working to decrease the loss of priority coastal habitat through its habitat conservation programs.

Sustainable Habitat Management
When a Federal agency authorizes, funds, or undertakes an action that may adversely affect Essential Fish Habitat (EFH), they must consult with NMFS on that action, as required by Section 305(b) of the Magnuson-Stevens Act. NOAA works with Federal partners to guide coastal development in a manner that protects vital fish habitat without hindering economic development opportunities, including critical transportation and infrastructure improvements.

Each year, NOAA protects more than one hundred thousand acres of EFH by conducting thousands of consultations with Federal agencies to avoid, minimize, or compensate for any adverse impacts to coastal habitat that may result from proposed actions such as dredging and filling wetlands, and renewable energy proposals. (https://www.fisheries.noaa.gov/national/habitat-conservation/essential-fish-habitat) Fish require healthy surroundings to survive and reproduce. EFH includes all types of aquatic habitat - wetlands, coral reefs, seagrasses, and rivers - where fish spawn, breed, feed, or grow to maturity. EFH is described and

[10] National Marine Fisheries Service. 2018. Fisheries Economics of the United States, 2016. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS-F/SPO-187. Available at: https://www.fisheries.noaa.gov/content/fisheries-economics-united-states-2016

[11] The National Ocean Economics Program and the Center for the Blue Economy. 2014. State of the U.S. Ocean and Coastal Economies. 84p. Available at: http://www.oceaneconomics.org/Download/

[12] T.E. Dahl and S.M. Stedman. 2013. Status and trends of wetlands in the coastal watersheds of the Conterminous United States 2004 to 2009. U.S. Department of the Interior, Fish and Wildlife Service and National Oceanic and Atmospheric Administration, National Marine Fisheries Service. (46 p.). Available at: https://coast.noaa.gov/digitalcoast/training/wetland-trends.html

designated by each of the Regional Fishery Management Councils in their development of Fishery Management Plans for Federally-managed fish species. Our unique role and responsibility under the Federal Power Act to ensure fish passage at hydropower dams licensed by the Federal Energy Regulatory Commission (FERC) has resulted in opening passage of more than 1,730 miles of streams and rivers for species such as river herring that serve as important food sources for commercial and recreational fish stocks. (https://www.fisheries.noaa.gov/national/habitat-conservation/improving-fish-migration-hydropower-dams) Since 2011, under its Deep Sea Coral Research and Technology program, NOAA has mapped more than 975,000 square kilometers of seafloor to identify locations and new species of deep-sea corals in coordination with other Federal agencies and research institutions. (https://www.fisheries.noaa.gov/national/habitat-conservation/deep-sea-coral-habitat)

Fisheries Habitat Restoration
The NOAA Office of Habitat Conservation Restoration Center (RC) provides expert technical assistance to its many partners for the implementation of priority coastal habitat restoration nationwide. (https://www.fisheries.noaa.gov/topic/habitat-conservation#how-we-restore) In addition, the NOAA RC leads restoration planning and implementation for oil spills and hazardous substance releases across the Nation through our Damage Assessment Remediation and Restoration program (DARRP) (https://darrp.noaa.gov/). Every year, NOAA responds to as many as 150 oil spills and hazardous substance releases (most notably the Deepwater Horizon oil spill. (https://www.gulfspillrestoration.noaa.gov/). The Community-based Restoration Program (CRP) provides technical and financial assistance for the implementation of community-driven habitat restoration. Habitat restoration projects are selected through a competitive solicitation process that leverages substantial investments from partners. (https://www.fisheries.noaa.gov/grant/coastal-and-marine-habitat-restoration-grants)

Chesapeake Bay Protection and Restoration (https://chesapeakebay.noaa.gov/)
The NOAA Chesapeake Bay Office (NCBO) conducts work in fisheries, observations, education, and oyster restoration in support of the 2014 Chesapeake Bay Agreement. NCBO collects and integrates information about the Bay from buoys, satellites, shipboard mapping technologies, and other sources to improve fisheries and protected resource management, weather forecasts, on-the-water safety, and public health. NCBO is working closely with state, Federal, academic, and not-for-profit partners to provide technical assistance for restoring native oysters in ten tributaries of the Chesapeake Bay.

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Habitat Conservation and Restoration	Pos./BA	185	59,132	185	99,132	0	40,000
	FTE/OBL	179	59,132	179	99,132	0	40,000

Large Scale Habitat Restoration to Build Climate Resilience (+$40,000, 0 FTE/0 Positions) – This request will develop a competitive process to select and implement large-scale habitat restoration projects that rebuild sustainable fisheries, contribute to the recovery of protected species, and build climate resilience for coastal ecosystems and communities around the country. This program would build upon NMFS' proven capacity and expert technical capability for implementing large-scale restoration projects, as demonstrated by our multi-year targeted restoration under the Community-based Restoration Program and large-scale regional restoration in coastal Louisiana and the Great Lakes. Drawing from a depth of restoration experience, NMFS works directly with coastal communities to overcome technical hurdles and shape sustainable solutions that maximize benefits for both coastal and marine species and community resilience.

Investing in habitat restoration strengthens the climate resilience of coastal ecosystems. As climate change accelerates habitat loss, disrupts fisheries, and increases storm frequency and intensity, the demand and need for large-scale habitat restoration solutions continues to grow. Coastal wetlands are crucial for healthy estuaries, which generate approximately half of commercially harvested seafood in the United States. Conserving and restoring habitats like coral and oyster reefs, wetlands, mangroves, and free-flowing rivers increases the resilience of ecosystems and fish to a changing climate. Restored habitat and resilient ecosystems can also reduce other impacts of climate change in coastal systems such as flooding and storm damage. Additionally, habitat restoration requires a diverse set of skills and is a significant source of jobs - supporting an average of 15 jobs per million dollars spent across a wide variety of fields.[13]

[13] Giselle Samonte, Peter Edwards, Julia Royster, Victoria Ramenzoni, and Summer Morlock. 2017. Socioeconomic Benefits of Habitat Restoration. NOAA Tech. Memo. NMFS-OHC-1, 66p.

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(Dollar amounts in thousands)

With the capacity to implement large-scale habitat restoration across coastal systems, NMFS will partner with non-federal entities to restore thousands of acres of coastal wetlands and open riverways to re-establish access to fisheries habitat and restore natural resilience of healthy ecosystems. This level of funding will enable NMFS to accelerate landscape-scale habitat restoration implemented directly with partners in coastal communities to help them meet the complexities and scale of climate change. It would also enable us to begin addressing the significant demand across the country for mid- to large-scale restoration projects. These larger-scale efforts to restore coastal ecosystems are necessary to increase their resilience to climate change and ensure that our valuable fisheries and threatened species are protected and sustained into the future.

There is an increasing need for NOAA to create and foster natural and economic resilience along our coasts through support, expertise and robust, on-the-ground partnerships and place-based conservation activities. Ecological restoration and community resilience, as outlined in EO 14008, are integral to NOAA and the Administration's climate strategy.

Schedule and Milestones:
(FY 2022 – FY 2026)

- Launch a competitive process open to non-federal entities from communities across the country and complete a comprehensive technical review to select high priority restoration projects and partners.
- Establish multi-year cooperative agreement grant awards that provide funding and expert technical assistance for large-scale habitat restoration projects.
- Develop restoration plans, support design and permitting, and implement priority restoration projects that use an ecosystem-based approach to foster species recovery, increase fish populations under NOAA's jurisdiction, and build resilience to climate change.
- Conduct targeted monitoring and evaluation of projects to quantify mid- and long-term economic and ecological outcomes.

Deliverables:
(FY 2022 – FY 2026)

- Technical restoration expertise delivered to partners to expedite planning and design, consider climate change and habitat adaptation, navigate permitting processes, and develop sustainable restoration solutions that maximize both resource benefits and community resilience.
- Completed high-priority large-scale projects that restore coastal wetlands, coral reef, shellfish, and riverine habitat to

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(Dollar amounts in thousands)

benefit fisheries resources while also strengthening coastal resilience to climate change.

- Community benefits such as reduced risk of flood damage, increased property values, and increased economic value of recreation.

Performance Measures	2022	2023	2024	2025	2026
Number of habitat acres restored (cumulative)					
With Increase	4,000	5,000	8,200	10,100	10,100
Without Increase	4,000	4,000	4,000	4,000	4,000
Number of stream miles made accessible (cumulative)					
With Increase	100	160	260	260	260
Without Increase	100	100	100	100	100
Outyear Costs:					
Direct Obligations	40,000	40,000	40,000	40,000	40,000
Capitalized	0	0	0	0	0
Uncapitalized	40,000	40,000	40,000	40,000	40,000
Budget Authority	40,000	40,000	40,000	40,000	40,000
Outlays	24,800	24,800	24,800	24,800	24,800
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Habitat Conservation and Restoration
Subactivity: Habitat Conservation and Restoration

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	22,350	22,247	23,745	23,745	0
11.3	Other than full-time permanent	261	260	278	278	0
11.5	Other personnel compensation	350	348	371	371	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	22,961	22,855	24,394	24,394	0
12	Civilian personnel benefits	8,065	8,028	8,568	8,568	0
13	Benefits for former personnel	17	17	17	17	0
21	Travel and transportation of persons	342	341	341	341	0
22	Transportation of things	120	119	119	119	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	820	816	816	816	0
23.2	Rental Payments to others	222	221	221	221	0
23.3	Communications, utilities and misc charges	359	357	357	357	0
24	Printing and reproduction	18	18	18	18	0
25.1	Advisory and assistance services	564	561	561	561	0
25.2	Other services from non-Federal sources	6,185	6,156	6,156	6,156	0
25.3	Other goods and services from Federal sources	589	586	586	586	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	495	493	493	493	0
31	Equipment	316	314	314	314	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	16,246	16,170	16,170	56,170	40,000
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	1	1	1	0
44	Refunds	0	0	0	0	0
99	Total obligations	57,320	57,053	59,132	99,132	40,000

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Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Pacific Coastal Salmon Recovery Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
2021 Enacted	2	2	65,000	65,000
Less: Obligations from Prior Year Balances	0	0	0	0
Plus: Other Adjustments-to-Base	0	0	0	0
2022 Base	2	2	65,000	65,000
Plus: 2022 Program Changes	0	0	0	0
2022 Estimate	2	2	65,000	65,000

		2020 Actual Personnel Amount		2021 Enacted Personnel Amount		2022 Base Personnel Amount		2022 Estimate Personnel Amount		Increase/ Decrease from 2022 Base Personnel Amount	
Pacific Coastal Salmon Recovery Fund	Pos/BA	1	64,935	2	65,000	2	65,000	0	65,000	0	0
	FTE/OBL	2	64,935	2	65,000	2	65,000	0	65,000	0	0
Total: Pacific Coastal Salmon Recovery Fund	Pos/BA	1	64,935	2	65,000	2	65,000	0	65,000	0	0
	FTE/OBL	2	64,935	2	65,000	2	65,000	0	65,000	0	0

Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Pacific Coastal Salmon Recovery Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/ Decrease from 2022 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	2	64,935	2	65,000	2	65,000	2	65,000	0	0
Total Obligations	**2**	**65,000**	**2**	**65,000**	**2**	**65,000**	**2**	**65,000**	**0**	**0**
Adjustments for:										
Recoveries	0	(61)	0	0	0	0	0	0	0	0
Unobligated balance, unapportioned	0	0	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	(112)	0	0	0	0	0	0	0	0
Unobligated balance, expired	0	156	0	0	0	0	0	0	0	0
Unobligated balance, transferred	0	17	0	0	0	0	0	0	0	0
Unobligated balance, adj. EOY	0	0	0	0	0	0	0	0	0	0
Total Budget Authority	**2**	**64,935**	**2**	**65,000**	**2**	**65,000**	**2**	**65,000**	**0**	**0**
Financing from Transfers and Other:										
Transfer to ORF	0	65	0	0	0	0	0	0	0	0
Appropriation	**2**	**65,000**	**2**	**65,000**	**2**	**65,000**	**2**	**65,000**	**0**	**0**

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National Oceanic and Atmospheric Administration
Pacific Coastal Salmon Recovery Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Pacific Coastal Salmon Recovery Fund

For FY 2022, NMFS requests a total of $65 million for this fund.

Goal Statement

The Pacific Coastal Salmon Recovery Fund (PCSRF) was established by Congress in FY 2000 to protect, restore, and conserve Pacific salmon and steelhead and their habitats through competitive funding to states and Tribes.

Base Program

Congressionally authorized activities include:

- Conserving salmon and steelhead populations that are listed as threatened or endangered, or identified by a state as at-risk to be so listed,
- Maintaining populations necessary for exercise of tribal treaty fishing rights or native subsistence fishing, and
- Conserving Pacific coastal salmon and steelhead habitat.

Key accomplishments for PCSRF-funded activities from FY 2000 to FY 2020 include:

- More than 1,150,000 acres of habitat restored, and
- Passage restored to over 11,400 stream miles of salmon habitat.

Restoration projects have increased the quality and quantity of spawning and rearing habitat from stream headwaters to coastal estuaries. Upstream restoration activities have controlled erosion, enhanced in-stream flow and streambed conditions, and provided the habitat necessary for successful spawning and egg survival. Estuary and wetland restoration projects closer to the coast have protected and improved feeding and rearing habitat used by juvenile fish as they transition from freshwater to the open ocean. PCSRF restoration projects have also removed nearly 3,700 barriers to fish passage along streams, restoring access to high-quality habitat. PCSRF projects provide a number of socio-economic benefits, including enhanced water quality, recreation opportunities, flood control, and coastline protection, as well as support for green jobs and local economies.

Department of Commerce
National Oceanic and Atmospheric Administration
Pacific Coastal Salmon Recovery Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Statement of Operating Objectives

PCSRF awards to grantees remain active for up to five years with an estimated 1,470 active projects funded from FY 2015 through FY 2020.

Active projects span all project categories, but a select list of habitat projects include:

- Alaska: Restoring Connectivity for Chinook and Coho Salmon in the Little Tonsina River (end date November 2023)
- Alaska: Strategic Conservation of Priority Salmon Habitat-Phase 8 (end date November 2023)
- Washington: Kwoneesum Dam Removal (end date February 2025)
- Washington: Hansen Creek Reach 5 Restoration (end date March 2022)
- Idaho: Sub-Reach 1 Implementation, Phase 2, Lower Lemhi Rehabilitation Project (end date December 2022)
- Idaho: Upper Tee Meadow Restoration (end date December 2021)
- Oregon: McKay Creek Water Rights Switch (end date December 2024)
- Oregon: Willamette Confluence Lower Middle Fork Revegetation (end date: June 2022)
- California: Fish Passage & Off-Channel Habitat Restoration at Roy's Pools (end date March 2022)
- California: Restoring Fish Passage from Salt River to Williams Creek (end date June 2023)

Explanation and Justification

The PCSRF program provides competitive funding to states and Tribes of the Pacific Coast region to implement projects that restore and protect salmonid populations and their habitats. Eligible applicants include the States of Washington, Oregon, California, Idaho, Nevada, and Alaska and federally recognized Tribes of the Columbia River and Pacific Coast (including Alaska). States are required to provide 33 percent matching funds, and PCSRF awards are supplemented further by significant private and local contributions at the project level. No match is required from the federally recognized Tribes.

PCSRF habitat projects provide a number of benefits to the human community, including enhanced water quality, recreation opportunities, flood control, and coastline protection. Studies suggest that a $1.0 million investment in watershed restoration, of

which PCSRF and state matching funds play a significant role, creates on average 16[14] to 17[15] new "green" jobs and averages $2.3 million[16] in economic activity. Additionally, approximately 80 percent of habitat restoration investments are spent locally in the county in which the project is located, and over 90 percent is spent within the state[17], supporting local jobs and local economies, often in rural and economically distressed communities. More information is available at the program's website: https://www.fisheries.noaa.gov/grant/pacific-coastal-salmon-recovery-fund

[14] Nielsen-Pincus, M., and C. Moseley. 2010. Economic and employment impacts of forest and watershed restoration in Oregon. University of Oregon, Institute for a Sustainable Environment, Ecosystem Workforce Program, Working Paper Number 24, Spring 2010.
[15] Edwards, P.E.T., A.E. Sutton-Grier and C.E. Coyle. 2013 Investing in nature: Restoring coastal habitat blue infrastructure and green job creation. Marine Policy 38:65-71.
[16] Nielsen-Pincus, M., and C. Moseley. 2010. Economic and employment impacts of forest and watershed restoration in Oregon. University of Oregon, Institute for a Sustainable Environment, Ecosystem Workforce Program, Working Paper Number 24, Spring 2010.
[17] Hibbard, M. and S. Lurie. 2006. Some community socio-economic benefits of watershed councils: A case study from Oregon. Journal of Environmental Planning and Management 49:891-908.

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Pacific Coastal Salmon Recovery Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
11	Personnel compensation					
11.1	Full-time permanent	143	143	143	143	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	143	143	143	143	0
12.1	Civilian personnel benefits	52	52	52	52	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	3	3	3	3	0
22	Transportation of things	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Commun., util., misc. charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-federal sources	123	123	123	123	0
26	Supplies and materials	0	0	0	0	0
31	Equipment	0	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	64,614	64,679	64,679	64,679	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	**Total Obligations**	64,935	65,000	65,000	65,000	0

Department of Commerce
National Oceanic and Atmospheric Administration
Pacific Coastal Salmon Recovery Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
Less prior year recoveries	(61)	0	0	0	0
Plus unobligated balance, transferred	17	0	0	0	0
Unobligated balance, expired	156	0	0	0	0
Less unobligated balance, SOY	(112)	0	0	0	0
Plus unobligated balance, EOY	0	0	0	0	0
Total Budget Authority	64,935	65,000	65,000	65,000	0

Personnel Data					
Full-Time equivalent Employment:					
Full-time permanent	2	2	2	2	0
Other than full time permanent	0	0	0	0	0
Total	2	2	2	2	0
Authorized Positions:					
Full-time permanent	1	2	2	2	0
Other than full time permanent	0	0	0	0	0
Total	1	2	2	2	0

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Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Disaster Assistance Fund
SUMMARY OF REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
2021 Enacted	0	0	300,000	300,000
Plus: Obligations from prior year balances	0	0	0	0
Plus: Other Adjustments-to-Base	0	0	(300,000)	(300,000)
2022 Base	0	0	0	0
Plus: 2022 Program Changes	0	0	0	0
2022 Estimate	0	0	0	0

		2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/ Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Fisheries Disaster Assistance Fund	Pos/BA	0	299,700	0	300,000	0	0	0	0	0	0
	FTE/OBL	0	329,919	0	300,000	0	0	0	0	0	0
Total: Fisheries Disaster Assistance Fund	Pos/BA	0	299,700	0	300,000	0	0	0	0	0	0
	FTE/OBL	0	329,919	0	300,000	0	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Disaster Assistance Fund
SUMMARY OF REQUIREMENTS
(Dollar amounts in thousands)

	2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/ Decrease from 2022 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	329,919	0	300,000	0	0	0	0	0	0
Total Obligations	**0**	**329,919**	**0**	**300,000**	**0**	**0**	**0**	**0**	**0**	**0**
Adjustments for:										
Recoveries	0	(168)	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	(198,748)	0	0	0	0	0	0	0	0
Unobligated balance, EOY	0	168,697	0	0	0	0	0	0	0	0
Total Budget Authority	**0**	**299,700**	**0**	**300,000**	**0**	**0**	**0**	**0**	**0**	**0**
Financing from Transfers and Other:										
Transfer to ORF	0	300	0	0	0	0	0	0	0	0
Net Appropriation	**0**	**300,000**	**0**	**300,000**	**0**	**0**	**0**	**0**	**0**	**0**

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Disaster Assistance Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Fisheries Disaster Assistance Fund

For FY 2022, NMFS requests a total of $0 for this fund.

Goal Statement

To provide disaster assistance for addressing the economic and social effects of a commercial fishery failure, for activities to restore the fishery or prevent a similar failure in the future, and for assisting fishing communities.

Base Program

Fishery disaster assistance is administered by NOAA's National Marine Fisheries Service within the Department of Commerce. Two statutes, the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and the Interjurisdictional Fisheries Act, provide the authority for fishery disaster assistance. Under both statutes, a request for a fishery disaster determination is generally made by the Governor of a State, or an elected leader of a fishing community, although the Secretary of Commerce may also initiate a review at his or her own discretion. The Secretary determines whether the circumstances are consistent with relevant statutes and warrant a fishery disaster determination. If the Secretary determines that a fishery disaster has occurred, Congress may appropriate funds for disaster assistance, which are administered by the Secretary.

Statement of Operating Objectives

- MSA 312(a)(2) allows for disaster funds to be used for assessing the economic and social effects of the commercial fishery failure and for activities that restore the fishery or prevent a similar failure in the future and to assist a fishing community affected by such failure. Additionally, any such activity may not expand the size or scope of the commercial fishery failure in that fishery or into other fisheries or other geographic regions.
- MSA 315(b) allows for funding or other economic assistance for meeting immediate shore-side infrastructure needs, financial assistance and job training for fishermen, fishing capacity reduction and other activities authorized under MSA 312(a) and IFA 308(d).

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Disaster Assistance Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

- IFA 308(b) authorizes the Secretary to use funds to restore the fishery affected by the failure or to prevent a similar failure in the future.
- IFA 308(d) enables the Secretary to help persons engaged in the commercial fishery through projects that alleviate the harm suffered from the fishery resource disaster.

Explanation and Justification

NOAA Fisheries is committed to quickly evaluating information from requestors for fishery disaster assistance to determine if a fishery disaster has occurred. To provide assistance, Congress may appropriate funding to help those affected by the disaster. If Congress appropriates funds, NOAA allocates the funding to specific fishery disasters and administers the funds through non-competitive awards consistent with spend plans developed by the recipients and approved by the Administration.

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Disaster Assistance Fund
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

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	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
11	Personnel compensation					
11.1	Full-time permanent	0	0	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	0	0	0	0	0
12.1	Civilian personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	0	0
22	Transportation of things	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Commun., util., misc. charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	245	3,000	0	0	0
25.2	Other services from non-federal sources	0	0	0	0	0
26	Supplies and materials	0	0	0	0	0
31	Equipment	0	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	329,674	297,000	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	**Total Obligations**	329,919	300,000	0	0	0

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Disaster Assistance Fund
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
Less prior year recoveries	(168)	0	0	0	0
Plus unobligated balance, transferred	0	0	0	0	0
Unobligated balance, expired	0	0	0	0	0
Less unobligated balance, SOY	(198,748)	0	0	0	0
Plus unobligated balance, EOY	168,697	0	0	0	0
Total Budget Authority	299,700	300,000	0	0	0

Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Fishermen's Contingency Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
2021 Enacted	0	0	349	349
Plus: Obligations from prior year balances	0	0	0	0
Plus: Other Adjustments-to-Base	0	0		0
2022 Base	0	0	349	349
Plus: 2022 Program Changes	0	0	0	0
2022 Estimate	0	0	349	349

		2020 Actual Personnel	Amount	2021 Enacted Personnel	Amount	2022 Base Personnel	Amount	2022 Estimate Personnel	Amount	Increase/ Decrease from 2022 Base Personnel	Amount
Fishermen's Contingency Fund	Pos/BA	0	6	0	349	0	349	0	349	0	0
	FTE/OBL	0	144	0	349	0	349	0	349	0	0
Total: Fishermen's Contingency Fund	Pos/BA	0	6	0	349	0	349	0	349	0	0
	FTE/OBL	0	144	0	349	0	349	0	349	0	0

Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Fishermen's Contingency Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/ Decrease from 2022 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	144	0	349	0	349	0	349	0	0
Total Obligations	**0**	**144**	**0**	**349**	**0**	**349**	**0**	**349**	**0**	**0**
Adjustments for:										
Unobligated balance, adj. SOY	0	(1,341)	0	(1,203)	0	(1,203)	0	(1,203)	0	0
Unobligated balance, EOY	0	1,203	0	1,203	0	1,203	0	1,203	0	0
Total Budget Authority	**0**	**6**	**0**	**349**	**0**	**349**	**0**	**349**	**0**	**0**
Financing from Transfers and Other:										
Temporarily Reduced	0	0	0	0	0	0	0	0	0	0
Unapportioned	0	0	0	0	0	0	0	0	0	0
Discretionary Appropriation	0	0	0	0	0	0	0	0	0	0
Net Appropriation	**0**	**6**	**0**	**349**	**0**	**349**	**0**	**349**	**0**	**0**

Department of Commerce
National Oceanic and Atmospheric Administration
Fishermen's Contingency Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Fishermen's Contingency Fund

For FY 2022, NMFS requests a total of $349 for this fund.

Goal Statement

This fund compensates U.S. commercial fishermen for damage or loss of fishing gear, vessels, and resulting economic loss caused by obstructions related to oil or gas exploration, development, and production in any area of the Outer Continental Shelf.

Base Program

The Fishermen's Contingency Fund is authorized under Section 402 of Title IV of the Outer Continental Shelf Lands Act Amendments of 1978. This fund minimizes financial instability of the fishing industry caused by competing uses of the OCS, and provides for timely resolution of claims by vessel owners.

Statement of Operating Objectives

Fishermen who can prove that they suffered losses in income due to inability or reduced capacity to fish as a result of the damage sustained may be eligible for compensation for economic loss and property loss or damage. Compensation for economic loss is based on 50 percent of gross income lost, rather than loss of profits.

Explanation and Justification

The funds used to provide this compensation are derived solely from fees collected on an annual basis by the Secretary of the Interior from the holders of leases, exploration permits, easements, or rights-of-way in areas of the OCS. Disbursements can be made only to the extent authorized in appropriation acts.

PROPOSED LEGISLATION:
For carrying out the provisions of Title IV of Public Law 95-372, not to exceed $349,000, to be derived from receipts collected pursuant to that Act, to remain available until expended.

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Fishermen's Contingency Fund
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
11	Personnel compensation					
11.1	Full-time permanent	0	0	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	0	0	0	0	0
12.1	Civilian personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	0	0
22	Transportation of things	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Commun., util., misc. charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.2	Other services from non federal sources	0	0	0	0	0
26	Supplies and materials	0	0	0	0	0
31	Equipment	0	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	0	0	0	0
42	Insurance claims and indemnities	144	349	349	349	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	**Total Obligations**	144	349	349	349	0

Department of Commerce
National Oceanic and Atmospheric Administration
Fishermen's Contingency Fund
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	2020 Enacted	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
Less prior year recoveries	0	0	0	0	0
Less unobligated balance, SOY	(1,341)	(1,203)	(1,203)	(1,203)	0
Less unapportioned	0	0	0	0	0
Plus unobligated balance, EOY	1,203	1,203	1,203	1,203	0
Unobligated balance, rescission	0	0	0	0	0
Total Budget Authority	6	349	349	349	0

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Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Foreign Fishing Observer Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
2021 Enacted	0	0	0	0
Less: Obligations from prior year balances	0	0	0	0
Plus: 2022 Adjustments to Base	0	0	0	0
2022 Base	0	0	0	0
Plus: 2022 Program Changes	0	0	0	0
2022 Estimate	0	0	0	0

		2020 Actual Personnel	Amount	2021 Enacted Personnel	Amount	2022 Base Personnel	Amount	2022 Estimate Personnel	Amount	Increase/ Decrease from 2022 Base Personnel	Amount
Foreign Fishing Observer Fund	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
Total: Foreign Fishing Observer Fund	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0

Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Foreign Fishing Observer Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/ Decrease from 2022 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	0	0	0	0	0	0	0	0	0
Total Obligations	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Adjustments for:										
Unobligated balance, adj. SOY	0	(522)	0	(522)	0	(522)	0	(522)	0	0
Unobligated balance, EOY	0	522	0	522	0	522	0	522	0	0
Total Budget Authority	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Financing from Transfers and Other:										
Unobligated balance, rescission	0	0	0	0	0	0	0	0	0	0
Net Appropriation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Department of Commerce
National Oceanic and Atmospheric Administration
Foreign Fishing Observer Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Foreign Fishing Observer Fund

For FY 2022, NMFS requests a total of $0 for this fund.

Goal Statement

The goals of this fund are to provide 100 percent observer coverage aboard foreign vessels fishing within the U.S. EEZ; increase compliance with fishery regulations and requirements; support balanced conservation and management measures to achieve and maintain the optimum use of living marine resources; collect data to determine foreign compliance with fishery regulations and the status of fish stocks within the U.S. EEZ; and administer the base and supplemental observer programs in a cost-effective manner.

Base Program

The Foreign Fishing Observer Fund is financed through fees collected from owners and operators of foreign fishing vessels fishing within the U.S. EEZ (such fishing requires a permit issued under the Magnuson-Stevens Fishery Conservation and Management Act). The fund is used by NOAA to pay salaries, administrative costs, data editing and entry, and other costs incurred in placing observers aboard foreign fishing vessels.

Statement of Operating Objectives

- Monitor foreign fishing for compliance with U.S. fishing regulations
- Collect biological data

Explanation and Justification

The observer program is conducted primarily through contracts with the private sector. This includes longline vessels fishing in the Atlantic billfish and shark fishery and other foreign vessels fishing in the EEZ. NOAA places these observers aboard foreign fishing vessels to monitor compliance with U.S. fishery laws and to collect fishery management data. Amounts available in the fund can be disbursed only to the extent and in amounts provided in appropriation acts. In FY 1985, Congress approved the establishment of a supplemental observer program. The program provided that foreign vessels without federally funded observers are required to obtain the services of private contractors certified by the Secretary of Commerce.

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Foreign Fishing Observer Fund
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
11	Personnel compensation					
11.1	Full-time permanent	0	0	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	0	0	0	0	0
12.1	Civilian personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	0	0
22	Transportation of things	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Commun., util., misc. charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.2	Other services from non-Federal sources	0	0	0	0	0
26	Supplies and materials	0	0	0	0	0
31	Equipment	0	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	**Total Obligations**	0	0	0	0	0

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Foreign Fishing Observer Fund
SUMMARY OF OUTYEAR CHANGES REQUESTED
(Dollar amounts in thousands)

	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
Less prior year recoveries	0	0	0	0	0
Less unobligated balance, SOY	(522)	(522)	(522)	(522)	0
Plus unobligated balance, EOY	522	522	522	522	0
Unobligated balance, rescission	0	0	0	0	0
Total Budget Authority	0	0	0	0	0

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Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Finance Program Account
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
2021 Enacted	0	0	3,564	3,564
Less: 2022 Adjustments to Base	0	0	(3,564)	(3,564)
2022 Base	0	0	0	0
Plus: 2022 Program Changes	0	0	0	0
2022 Estimate	0	0	0	0

		2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/ Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Fisheries Finance Program Account	Pos/BA	0	12,790	0	3,564	0	0	0	0	0	0
	FTE/OBL	0	12,790	0	3,564	0	0	0	0	0	0
Total: Fisheries Finance Program Account	Pos/BA	0	12,790	0	3,564	0	0	0	0	0	0
	FTE/OBL	0	12,790	0	3,564	0	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Finance Program Account
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/ Decrease from 2022 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Loan Modification	0	7,948	0	0	0	0	0	0	0	0
Credit Reestimates	0	4,841	0	3,564	0	0	0	0	0	0
Total Obligations	**0**	**12,790**	**0**	**3,564**	**0**	**0**	**0**	**0**	**0**	**0**
Adjustments for:										
Recoveries	0	(2)	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	(2,779)	0	(2,781)	0	(2,781)	0	(2,781)	0	0
Unobligated balance, EOY	0	2,781	0	2,781	0	2,781	0	2,781	0	0
Total Budget Authority	**0**	**12.790**	**0**	**3,564**	**0**	**0**	**0**	**0**	**0**	**0**
Financing from Transfers and Other:										
Less: Permanent Indefinite Authority (Mandatory)	0	0	0	0	0	0	0	0	0	0
Net Appropriation	**0**	**12,790**	**0**	**3,564**	**0**	**0**	**0**	**0**	**0**	**0**

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Finance Program Account
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Fisheries Finance Program Account

For FY 2022, NMFS requests a total of $0 for the Fisheries Finance Program Account.

Goal Statement

The Fisheries Finance Program (FFP) is a national loan program that makes long-term, fixed-rate financing available to U.S. citizens who otherwise qualify for financing or refinancing.

Base Program

NOAA's Fisheries Finance Program offers financing to U.S. companies seeking to improve their commercial fisheries and vessels. Vessel financing or refinancing that could contribute to overcapitalization by increasing harvesting capacity is prohibited by regulation.

Statement of Operating Objectives

The purpose of these loans is to provide affordable financing to support participants of the fishing and aquaculture industries.

Explanation and Justification

Types of activities for financing include the reconstruction, reconditioning, and, in some cases, the purchasing of fishing vessels, shoreside processing, aquaculture, mariculture facilities, purchase or refinance the purchase of harvesting rights in federally managed limited access systems, and the purchase of individual fishing quota (IFQ) in two Northwest fisheries. The FFP also provides fishery-wide financing to ease the transition to sustainable fisheries through its fishing capacity reduction programs and provides IFQ financing to fishermen who fish from small vessels and entry-level fishermen to promote stability and reduce consolidation in already rationalized fisheries. Additionally, FFP can provide loans for fisheries investments of Native American Community Development Quota (CDQ) groups.

The FFP operates under the authority of Title XI of the Merchant Marine Act of 1936, as amended (46 USC 53701); Section 303(a) of the Sustainable Fisheries Act amendments to the Magnuson-Stevens Fishery Conservation and Management Act; and, from time to time FFP-specific legislation. FFP lending practices are guided by Title XI, general rules implementing Title XI (found at 50 CFR part

253, subpart B), and NOAA's sustainable fisheries policy. The overriding guideline for all FFP financings is that they cannot contribute or be construed to contribute to an increase in existing fish harvesting.

FFP authority is subject to the Federal Credit Reform Act of 1990 (FCRA) (2 U.S.C. 661), which requires the estimated loan losses (FCRA cost) be appropriated in cash at the time Congress authorizes annual credit ceilings. Some types of FFP loans require no FCRA subsidy appropriations because these types of loans have historically not required additional loan subsidy. However, specific loan ceilings for each type of loan authority must be included in appropriation language or other bill language regardless of the need for cash appropriations.

PROPOSED LEGISLATION:
Subject to section 502 of the Congressional Budget Act of 1974, during fiscal year 2022, obligations of direct loans may not exceed $24,000,000 for Individual Fishing Quota loans and not to exceed $100,000,000 for traditional direct loans as authorized by the Merchant Marine Act of 1936.

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Finance Program Account
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
11	Personnel compensation					
11.1	Full-time permanent	0	0	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	0	0	0	0	0
12.1	Civilian personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	0	0
22	Transportation of things	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Commun., util., misc. charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.2	Other services from non-Federal sources	0	0	0	0	0
26	Supplies and materials	0	0	0	0	0
31	Equipment	0	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	12,790	3,564	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	**Total Obligations**	12,790	3,564	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Finance Program Account
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
Less prior year recoveries	0	0	0	0	0
Less unobligated balance, SOY	(2,779)	(2,781)	(2,781)	(2,781)	0
Plus unobligated balance, EOY	2,781	2,781	2,781	2,781	0
Unobligated balance, rescission	0	0	0	0	0
Total Budget Authority	12,790	3,564	0	0	0

Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Promote and Develop Fisheries Products
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
2021 Enacted	0	0	12,000	12,684
Less: Obligations from prior year balances	0	0	0	0
Plus: 2022 Adjustments to Base	0	0	(4,011)	(4,695)
2022 Base	0	0	0	0
Plus: 2022 Program Changes	0	0	0	0
2022 Estimate	0	0	7,989	7,989

		2020 Actual Personnel	Amount	2021 Enacted Personnel	Amount	2022 Base Personnel	Amount	2022 Estimate Personnel	Amount	Increase/ Decrease from 2022 Base Personnel	Amount
Promote and Develop Fisheries Products	Pos/BA	0	8,009	0	12,000	0	7,989	0	7,989	0	0
	FTE/OBL	0	8,485	0	12,684	0	7,989	0	7,989	0	0
Total: Promote and Develop Fisheries Products	Pos/BA	0	8,009	0	12,000	0	7,989	0	7,989	0	0
	FTE/OBL	0	8,485	0	12,684	0	7,989	0	7,989	0	0

Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Promote and Develop Fisheries Products
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/ Decrease from 2022 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	8,485	0	12,684	0	7,989	0	7,989	0	0
Total Obligations	**0**	**8,485**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Adjustments for:										
Unobligated balance, adj. SOY	0	(750)	0	(684)	0	0	0	0	0	0
Recoveries	0	(410)	0	0	0	0	0	0	0	0
Unobligated balance, adj. EOY	0	684	0	0	0	0	0	0	0	0
Total Budget Authority	**0**	**8,009**	**0**	**12,000**	**0**	**7,989**	**0**	**7,989**	**0**	**0**
Financing from Transfers and Other:										
Transfer from USDA	0	(183,834)	0	(262,275)	0	(253,669)	0	(253,669)	0	0
Appropriations previously unavailable	0	(9,795)	0	(10,846)	0	(14,950)	0	(14,950)	0	0
Permanently Reduced	0	0	0	0	0	0	0	0	0	0
Temporarily Reduced	0	10,846	0	14,950	0	14,459	0	14,459	0	0
Transfer to ORF	0	174,774	0	246,171	0	246,171	0	246,171	0	0
Net Appropriation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Department of Commerce
National Oceanic and Atmospheric Administration
Promote and Develop Fisheries Products
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Promote and Develop Fisheries Products

For FY 2022, NOAA estimates that a total of $253,669 will be transferred from the Department of Agriculture to the Promote and Develop account. After accounting for sequestration and prior year recoveries, $254,160 will be available in the account. NOAA requests to transfer $246,171 from the Promote and Develop account to the Operations, Research, and Facilities (ORF) account, leaving $7,989 for the Saltonstall-Kennedy (S-K) grant program in FY 2022.

Goal Statement

To address the needs of fishing communities in optimizing economic benefits by building and maintaining sustainable fisheries and practices, dealing with the impacts of conservation and management measures, and increasing other opportunities to keep working waterfronts viable.

Base Program

NOAA will transfer $246,171 from the Promote and Develop account to offset appropriations in the NMFS ORF account. The transfer to ORF will support data collection, data management, and fisheries stock assessment production within the Fisheries Data Collections, Surveys, and Assessments budget line, which includes the Expand Annual Stock Assessments, Fish Information Networks, Survey and Monitoring Projects, Cooperative Research activities; Fisheries Management Programs and Services; and Interjurisdictional Fisheries Grants.

Statement of Operating Objectives

Applications should fall into one of three priorities:

- Promotion, Development, and Marketing
- Marine Aquaculture
- Support of Science that Maximizes Fishing Opportunities, Revenue, and Jobs in U.S. Fisheries While Ensuring the Long-Term Sustainability of Marine Resources

Department of Commerce
National Oceanic and Atmospheric Administration
Promote and Develop Fisheries Products
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Explanation and Justification

The Promote and Develop account funds are derived from a transfer of thirty percent of duties on imported fisheries products from Department of Agriculture. Any funds remaining in this account after the ORF transfer are available to carry out the purposes of the S-K program. The American Fisheries Promotion Act (AFPA) of 1980 amended the S-K Act to authorize a grants program for fisheries research and development projects. In FY 2020, 30 projects were funded nationwide. The projects address either promotion, development and marketing and science or technology that promotes sustainable U.S seafood production and harvesting. More information on past accomplishments is available at the program's website http://www.nmfs.noaa.gov/mb/financial_services/skhome.htm.

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Promote and Develop Fisheries Products
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
11	Personnel compensation					
11.1	Full-time permanent	0	0	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	0	0	0	0	0
12.1	Civilian personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	0	0
22	Transportation of things	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Commun., util., misc. charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-federal sources	0	0	0	0	0
25.3	Other goods and services from Federal sources	0	0	0	0	0
26	Supplies and materials	0	0	0	0	0
31	Equipment	0	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	8,484	12,684	7,989	7,989	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	0	0	0	0
44	Refunds	0	0	0	0	0
99	**Total Obligations**	8,485	12,684	7,989	7,989	0

Department of Commerce
National Oceanic and Atmospheric Administration
Promote and Develop Fisheries Products
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
Less unobligated balance, SOY	(750)	(684)	0	0	0
Plus unobligated balance, EOY	684	0	0	0	0
Recoveries	(410)	0	0	0	0
Total Budget Authority	8,009	12,000	7,989	7,989	0

Personnel Data					
Full-Time equivalent Employment:					
Full-time permanent	0	0	0	0	0
Other than full time permanent	0	0	0	0	0
Total	0	0	0	0	0
Authorized Positions:					
Full-time permanent	0	0	0	0	0
Other than full time permanent	0	0	0	0	0
Total	0	0	0	0	0

Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Federal Ship Financing Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
2021 Enacted	0	0	0	0
2022 Base	0	0	0	0
Plus: 2022 Program Changes	0	0	0	0
2022 Estimate	0	0	0	0

		2020 Actual Personnel Amount		2021 Enacted Personnel Amount		2022 Base Personnel Amount		2022 Estimate Personnel Amount		Increase/ Decrease from 2022 Base Personnel Amount	
Federal Ship Financing Fund	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
Total: Federal Ship Financing Fund	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0

Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Federal Ship Financing Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/ Decrease from 2022 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	0	0	0	0	0	0	0	0	0
Total Obligations	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Adjustments for:										
Transfer to Treasury (mandatory)	0	0	0	0	0	0	0	0	0	0
Offsetting collections (mandatory)	0	0	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	0	0	0	0	0	0	0	0	0
Unobligated balance, adj. EOY	0	0	0	0	0	0	0	0	0	0
Total Budget Authority	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Department of Commerce
National Oceanic and Atmospheric Administration
Federal Ship Financing Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Federal Ship Financing Fund

For FY 2022, NMFS estimates a total of $0 for the Federal Ship Financing Fund Account.

Goal Statement

To provide for a liquidating account necessary for the collection of premiums and fees under the Fishing Vessel Obligations Guarantee program for loan commitments made prior to FY 1992.

Base Program

Administrative expenses for management of the loan guarantee portfolio were charged to the Federal Ship Financing Fund prior to the enactment of the Federal Credit Reform Act of 1990. Administrative expenses are charged to the ORF account.

Statement of Operating Objectives

- Collect repayments and interest
- Repay borrowings plus interest
- Pay default claims and interest

Explanation and Justification

These collections are for operations of this program, loans, and for use in case of default.

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Federal Ship Financing Fund
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
11	Personnel compensation					
11.1	Full-time permanent	0	0	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	0	0	0	0	0
12.1	Civilian personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	0	0
22	Transportation of things	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Commun., util., misc. charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.2	Other services from non-Federal sources	0	0	0	0	0
26	Supplies and materials	0	0	0	0	0
31	Equipment	0	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	**Total Obligations**	0	0	0	0	0

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Federal Ship Financing Fund
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
Plus transfers to Treasury	0	0	0	0	0
Less unobligated balance, SOY	0	0	0	0	0
Plus unobligated balance, EOY	0	0	0	0	0
Less offsetting Collections	0	0	0	0	0
Total Budget Authority	0	0	0	0	0

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Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Environmental Improvement and Restoration Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
2021 Enacted	0	0	6,289	6,290
Less: obligations from prior year balances	0	0	0	0
Plus: 2022 Adjustments to Base	0	0	(3,381)	(3,382)
2022 Base	0	0	2,908	2,908
plus: 2022 Program Changes	0	0	0	0
2022 Estimate	0	0	2,908	2,908

		2020 Actual Personnel	Amount	2021 Enacted Personnel	Amount	2022 Base Personnel	Amount	2022 Estimate Personnel	Amount	Increase/ Decrease from 2022 Base Personnel	Amount
Environmental Improvement and Restoration Fund	Pos/BA	0	6,676	0	6,289	0	2,908	0	2,908	0	0
	FTE/OBL	0	6,676	0	6,290	0	2,908	0	2,908	0	0
Total: Environmental Improvement and Restoration Fund	Pos/BA	0	6,676	0	6,289	0	2,908	0	2,908	0	0
	FTE/OBL	0	6,676	0	6,290	0	2,908	0	2,908	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Environmental Improvement and Restoration Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/ Decrease from 2022 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Mandatory Obligation	0	6,676	0	6,290	0	2,908	0	2,908	0	0
Total Obligations	**0**	**6,676**	**0**	**6,290**	**0**	**2,908**	**0**	**2,908**	**0**	**0**
Adjustments for:										
Unobligated balance, adj. SOY	0	0	0	(1)	0	0	0	0	0	0
Recoveries	0	(1)	0	0	0	0	0	0	0	0
Unobligated balance, adjusted	0	0	0	0	0	0	0	0	0	0
Unobligated balance, EOY	0	1	0	0	0	0	0	0	0	0
Total Budget Authority	**0**	**6,676**	**0**	**6,289**	**0**	**2,908**	**0**	**2,908**	**0**	**0**
Financing from Transfers and Other:										
Appropriation previously unavailable	0	0	0	0	0	0	0	0	0	0
Permanently Reduced	0	419	0	380	0	176	0	176	0	0
Net Mandatory Appropriation	**0**	**7,095**	**0**	**6,669**	**0**	**3,084**	**0**	**3,084**	**0**	**0**

Department of Commerce
National Oceanic and Atmospheric Administration
Environmental Improvement and Restoration Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Environmental Improvement and Restoration Fund

For FY 2022, NMFS estimates obligating $2,908 in the Environmental Improvement and Restoration Fund.

Goal Statement

The Environmental Improvement and Restoration Fund (EIRF) was created by the Department of Interior and Related Agencies Appropriations Act of 1998 for the purpose of carrying out marine research activities in the North Pacific.

Base Program

These funds will provide grants to Federal, state, private, or foreign organizations or individuals to conduct research activities on or relating to the fisheries or marine ecosystems in the North Pacific Ocean, Bering Sea, and Arctic Ocean.

Statement of Operating Objectives

- Improve understanding of North Pacific marine ecosystem dynamics and use of the resources
- Improve ability to forecast and respond to effects of changes through integration of various research activities including long-term monitoring
- Improve ability to manage and protect fish and wildlife populations of the North Pacific

Explanation and Justification

Each year NOAA's EIRF account is financed with a transfer from the Department of the Interior. NOAA grants these funds to the North Pacific Research Board (NPRB), which conducts an open, competitive process for gathering research proposals. Through this process, the NPRB recommends research projects relating to fisheries or marine ecosystems in the North Pacific Ocean, Bering Sea, and Arctic Ocean, with emphasis on cooperative research designed to address pressing fishery management or marine ecosystem information needs.

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Environmental Improvement and Restoration Fund
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
11	Personnel compensation					
11.1	Full-time permanent	0	0	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	0	0	0	0	0
12.1	Civilian personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	0	0
22	Transportation of things	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Commun., util., misc. charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.2	Other services from non-Federal sources	0	0	0	0	0
26	Supplies and materials	0	0	0	0	0
31	Equipment	0	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	6,676	6,290	2,908	2,908	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	**Total Obligations**	6,676	6,290	2,908	2,908	0

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Environmental Improvement and Restoration Fund
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
Less unobligated balance, SOY	0	(1)	0	0	0
Plus unobligated balance, adjusted	0	0	0	0	0
Less unobligated balance, transferred	0	0	0	0	0
Plus unobligated balance, EOY	1	0	0	0	0
Recoveries	(1)	0	0	0	0
Total Budget Authority	6,676	6,289	2,908	2,908	0

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Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Limited Access System Administration Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
2021 Enacted	40	40	13,477	14,999
Adjustments to Base	0	0	0	0
Less: Obligations from Prior Year Balances	0	0	202	(446)0
2022 Base	40	40	13,679	14,553
Plus: 2022 Program Changes	0	0	0	0
2022 Estimate	40	40	13,679	14,553

		2020 Actual Personnel Amount		2021 Enacted Personnel Amount		2022 Base Personnel Amount		2022 Estimate Personnel Amount		Increase/ Decrease from 2022 Base Personnel Amount	
Limited Access System Administration Fund	Pos/BA	27	13,443	40	13,477	40	13,679	40	13,679	0	0
	FTE/OBL	27	15,528	40	14,999	40	14,553	40	14,553	0	0
Total: Limited Access System Administration Fund	Pos/BA	27	13,443	40	13,477	40	13,679	40	13,679	0	0
	FTE/OBL	27	15,528	40	14,999	40	14,553	40	14,553	0	0

Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Limited Access System Administration Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/ Decrease from 2022 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	27	15,528	40	14,999	40	14,553	40	14,553	0	0
Total Obligations	**27**	**15,528**	**40**	**14,999**	**40**	**14,553**	**40**	**14,553**	**0**	**0**
Adjustments for:										
Recoveries	0	(2,251)	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	(19,643)	0	(19,809)	0	(18,287)	0	(18,287)	0	0
Unobligated balance, unapportioned	0	0	0	0	0	0	0	0	0	0
Unobligated balance, EOY	0	19,809	0	18,287	0	17,413	0	17,413	0	0
Total Budget Authority	**27**	**13,443**	**40**	**13,477**	**40**	**13,679**	**40**	**13,679**	**0**	**0**
Financing from Transfers and Other:										
Appropriations previously unavailable	0	(865)	0	(789)	0	(767)	0	(767)	0	0
Temporarily Reduced	0	789	0	767	0	780	0	780	0	0
Net Appropriation	**27**	**13,367**	**40**	**13,455**	**40**	**13,692**	**40**	**13,692**	**0**	**0**

Department of Commerce
National Oceanic and Atmospheric Administration
Limited Access System Administration Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Limited Access System Administration Fund

For FY 2022, NMFS estimates obligating $14,553 in the Limited Access System Administration account.

Goal Statement

To provide for the collection of fees to recover the incremental costs of management, data collection, and enforcement of Limited Access Privilege (LAP) programs.

Base Program

Under the authority of Magnuson-Stevens Fishery Conservation and Management Act (MSA) Section 304(d)(2)(A) funds collected are deposited into the "Limited Access System Administrative Fund" (LASAF). Fees cannot exceed three percent of the ex-vessel value of fish harvested under any such program, and shall be collected at either the time of the landing, filing of a landing report, or sale of such fish during a fishing season or in the last quarter of the calendar year in which the fish is harvested.

Statement of Operating Objectives

- Provide repository for fees collected from Limited Access Programs
- Fund incremental costs of management, data collection and analysis, and enforcement of limited access privilege programs

Explanation and Justification

The LASAF is available, without appropriation or fiscal year limitation, only for the purposes of administrating the central registry system; and administering and implementing the MSA in the fishery in which the fees were collected. Sums in the fund that are not currently needed for these purposes are kept on deposit or invested in obligations of, or guaranteed by, the United States. Also, in establishing a LAP program, a Regional Council can consider, and may provide, if appropriate, an auction system or other program to collect royalties for the initial or any subsequent distribution of allocations. If an auction system is developed, revenues from these royalties are deposited in the LASAF.

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Limited Access System Administration Fund
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
11	Personnel compensation					
11.1	Full-time permanent	2,695	3,609	3,609	3,609	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	276	328	328	328	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	2,971	3,937	3,937	3,937	0
12.1	Civilian personnel benefits	1,233	1,759	1,759	1,759	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	26	42	42	42	0
22	Transportation of things	7	7	7	7	0
23.1	Rental payments to GSA	301	367	367	367	0
23.2	Rental payments to others	5	5	5	5	0
23.3	Commun., util., misc. charges	31	31	31	31	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	195	195	195	195	0
25.2	Other services from non-Federal sources	6,534	3,713	3,267	3,267	0
25.3	Other goods and services from Federal sources	432	432	432	432	0
26	Supplies and materials	211	211	211	211	0
31	Equipment	48	48	48	48	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	3,533	4,252	4,252	4,252	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	0	0	0	0
44	Refunds	0	0	0	0	0
99	**Total Obligations**	15,528	14,999	14,553	14,553	0

Department of Commerce
National Oceanic and Atmospheric Administration
Limited Access System Administration Fund
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
Recoveries	(2,251)	0	0	0	0
Less unobligated balance, SOY	(19,643)	(19,809)	(18,287)	(18,287)	0
Unobligated balance, unapportioned	0	0	0	0	0
Plus unobligated balance, EOY	19,809	18,287	17,413	17,413	0
Unobligated balance, rescission	0	0	0	0	0
Total Budget Authority	13,443	13,477	13,679	13,679	0

Personnel Data					
Full-Time equivalent Employment:					
Full-time permanent	27	40	40	40	0
Other than full time permanent	0	0	0	0	0
Total	27	40	40	40	0
Authorized Positions:					
Full-time permanent	27	40	40	40	0
Other than full time permanent	0	0	0	0	0
Total	27	40	40	40	0

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Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Marine Mammal Unusual Mortality Event Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
2021 Enacted	0	0	0	0
Adjustments to Base	0	0	0	0
2022 Base	0	0	0	0
Plus: 2022 Program Change	0	0	0	0
2022 Estimate	0	0	0	0

		2020 Actual Personnel Amount		2021 Enacted Personnel Amount		2022 Base Personnel Amount		2022 Estimate Personnel Amount		Increase/ Decrease from 2022 Base Personnel Amount	
Marine Mammal Unusual Mortality Event Fund	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
Total: Marine Mammal Unusual Mortality Event Fund	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0

Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Marine Mammal Unusual Mortality Event Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/ Decrease from 2022 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	0	0	0	0	0	0	0	0	0
Total Obligations	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Adjustments for:										
Recoveries	0	(6)	0	0	0	0	0	0	0	0
Collections	0	0	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	(27)	0	(33)	0	(33)	0	(33)	0	0
Unobligated balance, unapportioned	0	0	0	0	0	0	0	0	0	0
Unobligated balance, EOY	0	33	0	33	0	33	0	33	0	0
Total Budget Authority	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Financing from Transfers and Other:										
Appropriation previously unavailable	0	0	0	0	0	0	0	0	0	0
Net Appropriation	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Department of Commerce
National Oceanic and Atmospheric Administration
Marine Mammal Unusual Mortality Event Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Marine Mammal Unusual Mortality Event Fund

For FY 2022, NMFS estimates obligating up to $0 from the Marine Mammal Unusual Mortality Event Fund.

Provide funds to support investigations and responses to unusual marine mammal mortality events.

Base Program

An unusual mortality event (UME) is defined under the Marine Mammal Protection Act (MMPA) as "a stranding that is unexpected; involves a significant die-off of any marine mammal population; and demands immediate response." In recent years, increased efforts to examine carcasses and live stranded animals have improved the knowledge of mortality rates and causes, allowing a better understanding of population threats and stressors and the ability to determine when a situation is "unusual." Understanding and investigating marine mammal UMEs is important because they can serve as indicators of ocean health, giving insight into larger environmental issues, which may also have implications for human health.

Statement of Operating Objectives

MMPA Section 405 (16 U.S.C. 1421d) establishes the Marine Mammal Unusual Mortality Event Fund and describes its purposes and how donations can be made to the Fund. The Fund is an emergency response fund used to help cover expenses incurred by the volunteer Marine Mammal Stranding Network during a UME. Specifically, the fund: "shall be available only for use by the Secretary of Commerce, in consultation with the Secretary of the Interior: to compensate persons for special costs incurred in acting in accordance with the contingency plan issued under section 1421c(b) of this title or under the direction of an Onsite Coordinator for an unusual mortality event:

- for reimbursing any stranding network participant for costs incurred in preparing and transporting tissues collected with respect to an unusual mortality event for the Tissue Bank; and,
- for care and maintenance of marine mammal seized under section 1374(c)(2)(D) of this title."

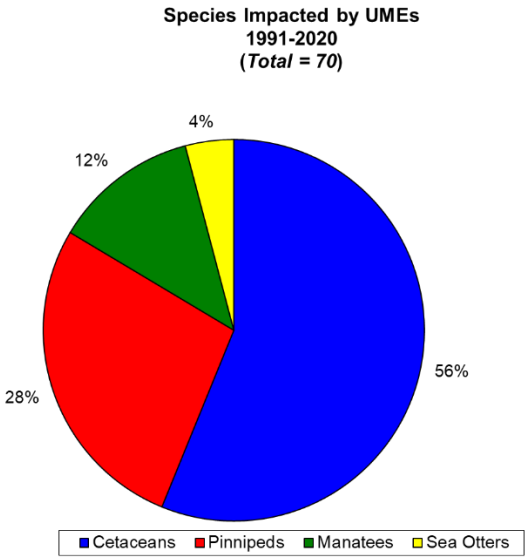
According to the MMPA, deposits can be made into Fund in the following ways:

- "amounts appropriated to the Fund;

Department of Commerce
National Oceanic and Atmospheric Administration
Marine Mammal Unusual Mortality Event Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

- other amounts appropriated to the Secretary for use with respect to unusual mortality events; and,
- amounts received by the United States in the form of gifts, devises, and bequests under subsection (d) of this section."

NOAA will continue to utilize the UME Contingency Fund to support the Marine Mammal Stranding Network's eligible work as needed.



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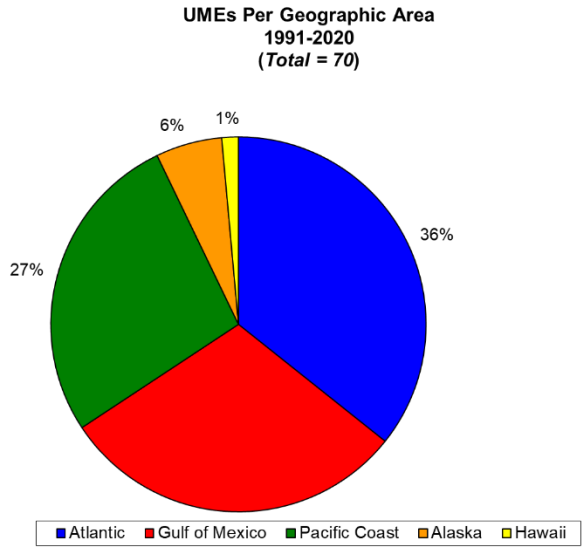
National Oceanic and Atmospheric Administration
Marine Mammal Unusual Mortality Event Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)



Explanation and Justification

Since UMEs are unpredictable emergency events caused by any number of circumstances (natural or human-caused), it is impossible to anticipate how many UMEs may occur in a given year or how much funding will be needed. During the past 29 years (1991– 2020), NOAA declared 70 UMEs, an average of ~2.4 UMEs per year. The highest number of UMEs declared in a year was five (in both 2006 and 2007). The costs associated with UMEs are highly variable and depend on the species involved, location, equipment, and laboratory needs. For example, a UME involving large whales offshore can cost well over several $100,000s in expenses because of the considerable logistical challenges and needs (e.g., ship time or aerial support, number of personnel, safety equipment, etc.)

To date, Congress has appropriated funding for UMEs on one occasion in 2005. Some of those funds were transferred to the National Fish and Wildlife Foundation (NFWF) since they have the ability to quickly distribute funds within 30 days of invoicing to our partners during a UME. At this time there are sufficient funds held at NFWF to meet most of our expected expenses in FY 2021 and

we anticipate obligating up to $20 from the Marine Mammal Unusual Mortality Event Fund in FY 2022. Additionally, the UME Contingency fund is listed on Pay.gov allowing the public to donate to the fund year round.

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Marine Mammal Unusual Mortality Event Fund
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
11	Personnel compensation					
11.1	Full-time permanent	0	0	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	0	0	0	0	0
12.1	Civilian personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	0	0
22	Transportation of things	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Commun., util., misc. charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.2	Other services from non-federal sources	0	0	0	0	0
26	Supplies and materials	0	0	0	0	0
31	Equipment	0	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	**Total Obligations**	0	0	0	0	0

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Marine Mammal Unusual Mortality Event Fund
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
Less prior year recoveries	(6)	0	0	0	0
Less unobligated balance, SOY	(27)	(33)	(33)	(33)	0
Plus unobligated balance, EOY	33	33	33	33	0
Less collections	0	0	0	0	0
Unobligated balance, unapportioned	0	0	0	0	0
Total Budget Authority	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Western Pacific Sustainable Fisheries Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
2021 Enacted	0	0	493	493
Adjustments to Base	0	0	102	102
2022 Base	0	0	595	595
Plus: 2022 Program Changes	0	0	0	0
2022 Estimate	0	0	595	595

		2020 Actual Personnel Amount		2021 Enacted Personnel Amount		2022 Base Personnel Amount		2022 Estimate Personnel Amount		Increase/ Decrease from 2022 Base Personnel Amount	
Western Pacific Sustainable Fisheries Fund	Pos/BA	0	384	0	493	0	595	0	595	0	0
	FTE/OBL	0	509	0	493	0	595	0	595	0	0
Total: Western Pacific Sustainable Fisheries Fund	Pos/BA	0	384	0	493	0	595	0	595	0	0
	FTE/OBL	0	509	0	493	0	595	0	595	0	0

Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Western Pacific Sustainable Fisheries Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/ Decrease from 2022 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	509	0	493	0	595	0	595	0	0
Total Obligations	**0**	**509**	**0**	**493**	**0**	**595**	**0**	**595**	**0**	**0**
Adjustments for:										
Recoveries	0	0	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	(125)	0	0	0	0	0	0	0	0
Unobligated balance, unapportioned	0	0	0	0	0	0	0	0	0	0
Unobligated balance, EOY	0	0	0	0	0	0	0	0	0	0
Total Budget Authority	**0**	**384**	**0**	**493**	**0**	**595**	**0**	**595**	**0**	**0**
Financing from Transfers and Other:										
Appropriation previously unavailable	0	(31)	0	(22)	0	(29)	0	(29)	0	0
Temporarily Reduced	0	22	0	29	0	34	0	34	0	0
Net Appropriation	**0**	**375**	**0**	**500**	**0**	**600**	**0**	**600**	**0**	**0**

Department of Commerce
National Oceanic and Atmospheric Administration
Western Pacific Sustainable Fisheries Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Western Pacific Sustainable Fisheries Fund

For FY 2022, NMFS estimates obligating $595 in the Western Pacific Sustainable Fisheries Fund.

Goal Statement

The purpose of this fund is to allow foreign fishing within the U.S. Exclusive Economic Zone (EEZ) in the Western Pacific through a Pacific Insular Area Fishery Agreement.

Base Program

Section 204(e) of the 2006 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSA) authorizes the establishment of the Western Pacific Sustainable Fisheries Fund. Before entering an Agreement, the Western Pacific Fishery Management Council must develop a Marine Conservation Plan that provides details on uses for any funds collected by the Secretary of Commerce. Marine Conservation Plans must also be developed by the Governors of the Territories of Guam and American Samoa and of the Commonwealth of the Northern Mariana Islands and approved by the Secretary or designee.

Statement of Operating Objectives

The conservation and management objectives for the Western Pacific Sustainable Fisheries Fund are listed in the four marine conservation plans:

- Hawaii and Pacific Insular Areas
- Guam
- American Samoa
- Commonwealth of the Northern Mariana Islands.

Explanation and Justification

Department of Commerce
National Oceanic and Atmospheric Administration
Western Pacific Sustainable Fisheries Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

The Western Pacific Sustainable Fisheries Fund serves as a repository for any permit payments received by the Secretary for foreign fishing within the U.S. EEZ around Johnston Atoll, Kingman Reef, Palmyra Atoll, and Jarvis, Howland, Baker and Wake Islands, sometimes known as the Pacific remote island areas (PRIA). Funds are available to:

- The Western Pacific Council for the purpose of carrying out implementation of a marine conservation plan (see below for more info on marine conservation plans).
- The Secretary of State for mutually agreed upon travel expenses for no more than two Federal representatives incurred as a direct result of negotiations and entering into a Pacific Insular Area fishery agreement. These fishery agreements authorize foreign fishing within the exclusive economic zone adjacent to a Pacific Insular Area other than American Samoa, Guam, or the Northern Mariana Islands, at the request of the Western Pacific Council.
- The Western Pacific Council to meet conservation and management objectives in the State of Hawaii if monies remain in the Western Pacific Sustainable Fisheries Fund after the funding requirements of Section 204(e) subparagraphs (A) and (B) of the 2006 amendments to the MSA have been satisfied.

In the case of violations by foreign vessels occurring in these areas, amounts received by the Secretary attributable to fines and penalties are deposited into the fund to be used for fisheries enforcement and for implementation of a marine conservation plan. Additionally, any funds or contributions received in support of conservation and management objectives under a Marine Conservation Plan for any Pacific Insular Area other than American Samoa, Guam, or the Northern Mariana Islands are deposited in the fund.

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Western Pacific Sustainable Fisheries Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
11	Personnel compensation					
11.1	Full-time permanent	0	0	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	0	0	0	0	0
12.1	Civilian personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	0	0
22	Transportation of things	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Commun., util., misc. charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.2	Other services from non-Federal sources	0	0	0	0	0
26	Supplies and materials	0	0	0	0	0
31	Equipment	0	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	509	493	595	595	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	**Total Obligations**	509	493	595	595	0

Department of Commerce
National Oceanic and Atmospheric Administration
Western Pacific Sustainable Fisheries Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
Recoveries	0	0	0	0	0
Less unobligated balance, SOY	(125)	0	0	0	0
Plus unobligated balance, EOY	0	0	0	0	0
Unobligated balance, unapportioned	0	0	0	0	0
Total Budget Authority	384	493	595	595	0

Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Asset Forfeiture Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
2021 Enacted	0	0	3,594	7,532
Adjustments to Base			0	0
Less: Obligations from Prior Year Balances	0	0	102	668
2022 Base	0	0	3,696	8,200
Plus: 2022 Program Changes	0	0	0	0
2022 Estimate	0	0	3,696	8,200

		2020 Actual Personnel Amount		2021 Enacted Personnel Amount		2022 Base Personnel Amount		2022 Estimate Personnel Amount		Increase/ Decrease from 2022 Base Personnel Amount	
Fisheries Asset Forfeiture Fund	Pos/BA	0	(3,004)	0	3,594	0	3,696	0	3,696	0	0
	FTE/OBL	0	3,408	0	7,532	0	8,200	0	8,200	0	0
Total: Fisheries Asset Forfeiture Fund	Pos/BA	0	(3,004)	0	3,594	0	3,696	0	3,696	0	0
	FTE/OBL	0	3,408	0	7,532	0	8,200	0	8,200	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Asset Forfeiture Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/ Decrease from 2022 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Mandatory Obligation	0	3,408	0	7,532	0	8,200	0	8,200	0	0
Total Obligations	**0**	**3,408**	**0**	**7,532**	**0**	**8,200**	**0**	**8,200**	**0**	**0**
Adjustments for:										
Recoveries	0	0	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	(16,855)	0	(10,443)	0	(6,505)	0	(6,505)	0	0
Unobligated balance, EOY	0	10,443	0	6,505	0	2,001	0	2,001	0	0
Total Budget Authority	**0**	**(3,004)**	**0**	**3,594**	**0**	**3,696**	**0**	**3,696**	**0**	**0**
Financing from Transfers and Other:										
Mandatory Appropriation										
Temporarily Reduced	0	5,109	0	211	0	211	0	211	0	0
Appropriations previously unavailable	0	(258)	0	(5,109)	0	(211)	0	(211)	0	0
Unobligated balance, Rescission	0	0	0	5,000	0	0	0	0	0	0
Net Appropriation	**0**	**1,847**	**0**	**3,696**	**0**	**3,696**	**0**	**3,696**	**0**	**0**

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Asset Forfeiture Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Fisheries Asset Forfeiture Fund

For FY 2022, NMFS estimates it will collect $3,696 in fines, penalties, and forfeitures proceeds.

Goal Statement

To pay certain enforcement-related expenses from fines, penalties, and forfeiture proceeds received for violations of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), Marine Mammal Protection Act (MMPA), National Marine Sanctuaries Act, or any other marine resource law enforced by the Secretary.

Base Program

Pursuant to Section 311(e)(1) of the MSA, NOAA has established a Civil Monetary Penalty/Asset Forfeiture Fund (AFF) where these proceeds are deposited.

Statement of Operating Objectives

The objective of the AFF is to provide a repository for fines, penalties and forfeiture proceeds, which are only used to fund the authorized costs listed below.

Explanation and Justification

When Congress established the AFF it was deemed appropriate to use these proceeds to offset in part the costs of administering the Enforcement program. Expenses funded through this source include: costs directly related to the storage, maintenance, and care of seized fish, vessels, or other property during a civil or criminal proceeding; expenditures related directly to specific investigations and enforcement proceedings such as travel for interviewing witnesses; enforcement-unique information technology infrastructure; and annual interagency agreement and contract costs for the administrative adjudication process, including Administrative Law Judges.

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Asset Forfeiture Fund
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
11	Personnel compensation					
11.1	Full-time permanent	0	0	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	0	0	0	0	0
12.1	Civilian personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	1,025	2,079	2,079	2,079	0
22	Transportation of things	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental payments to others	15	15	15	15	0
23.3	Commun., util., misc. charges	0	1	3	3	0
24	Printing and reproduction	0	10	10	10	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	149	2,838	3,504	3,504	0
25.3	Other goods and services from Federal sources	1,830	1,983	1,983	1,983	0
26	Supplies and materials	95	158	158	158	0
31	Equipment	44	198	198	198	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	250	250	250	250	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	**Total Obligations**	**3,408**	**7,532**	**8,200**	**8,200**	**0**

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Asset Forfeiture Fund
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
Less unobligated balance, SOY	(16,855)	(10,443)	(6,505)	(6,505)	0
Recoveries	0	0	0	0	0
Plus unobligated balance, EOY	10,443	6,505	2,001	2,001	0
Total Budget Authority	**(3,004)**	**3,594**	**3,696**	**3,696**	**0**

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Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
North Pacific Observer Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
2021 Enacted	0	0	2,528	3,251
Adjustments to Base	0	0	0	0
Less: Obligations from Prior Year Balances	0	0	1,387	664
2022 Base	0	0	3,915	3,915
Plus: 2022 Program Changes	0	0	0	0
2022 Estimate	0	0	3,915	3,915

		2020 Actual Personnel Amount		2021 Enacted Personnel Amount		2022 Base Personnel Amount		2022 Estimate Personnel Amount		Increase/ Decrease from 2022 Base Personnel Amount	
North Pacific Observer Fund	Pos/BA	0	2,935	0	2,528	0	3,915	0	3,915	0	0
	FTE/OBL	0	5,091	0	3,251	0	3,915	0	3,915	0	0
Total: North Pacific Observer Fund	Pos/BA	0	2,935	0	2,528	0	3,915	0	3,915	0	0
	FTE/OBL	0	5,091	0	3,251	0	3,915	0	3,915	0	0

Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
North Pacific Observer Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/ Decrease from 2022 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Mandatory Obligation	0	5,091	0	3,251	0	3,915	0	3,915	0	0
Total Obligations	**0**	**5,091**	**0**	**3,251**	**0**	**3,915**	**0**	**3,915**	**0**	**0**
Adjustments for:										
Recoveries	0	(722)	0	0	0	0	0	0	0	0
Unobligated balance, SOY	0	(2,157)	0	(723)	0	0	0	0	0	0
Unobligated balance, EOY	0	723	0	0	0	0	0	0	0	0
Total Budget Authority	**0**	**2,935**	**0**	**2,528**	**0**	**3,915**	**0**	**3,915**	**0**	**0**
Financing from Transfers and Other:										
Appropriation previously unavailable	0	(211)	0	(171)	0	(143)	0	(143)	0	0
Temporarily Reduced	0	171	0	143	0	228	0	228	0	0
Net Appropriation	**0**	**2,895**	**0**	**2,500**	**0**	**4,000**	**0**	**4,000**	**0**	**0**

Department of Commerce
National Oceanic and Atmospheric Administration
North Pacific Observer Fund
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: North Pacific Observer Fund

For FY 2022, NMFS estimates obligating $3,915 for the North Pacific Observer Fund.

Goal Statement

To fund observer coverage on the vessels and processors in the partial coverage category within the North Pacific Groundfish Observer Program (NPGOP).

Base Program

On January 1, 2013, the restructured NPGOP went into effect and made important changes to how observers are deployed, how observer coverage is funded, and the vessels and processors that must have some or all of their operations observed.

Statement of Operating Objectives

- Collect catch data onboard fishing vessels and at onshore processing plants that is used for in-season management and scientific purposes such as stock assessments and ecosystem studies
- Ensure that the data collected by observers are of the highest quality possible by implementing rigorous quality control and quality assurance processes

Explanation and Justification

Coverage levels are no longer based on vessel length and processing volume; rather, NMFS now has the flexibility to decide when and where to deploy observers based on a scientifically defensible deployment plan. The new observer program places all vessels and processors in the groundfish and halibut fisheries off Alaska into one of two observer coverage categories: (1) full coverage category and (2) partial coverage Vessels and processors in the full coverage category (≥100% observer coverage) will obtain observers by contracting directly with observer providers. Vessels and processors in the full observer coverage category are required to have at least one observer at all times. This will represent no change from the status quo for participants in the full coverage category. Vessels and processors in the partial coverage category (<100% observer coverage) will no longer contract independently with an observer provider, and will be required to carry an observer when they are selected through the Observer Declare and

Deploy System (ODDS). Additionally, landings from all vessels in the partial coverage category will be assessed a 1.25 percent fee on standard ex-vessel prices of the landed catch weight of groundfish and halibut. The fee percentage is set in regulation and will be reviewed periodically by the North Pacific Council after the second year of the program. The money generated by this fee will be used to pay for observer coverage on the vessels and processors in the partial coverage category in the following year. NMFS expects approximately $4.0 million to be collected in fees from the FY 2021 season, to be used in FY 2022 for observer coverage.

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
North Pacific Observer Fund
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
11	Personnel compensation					
11.1	Full-time permanent	0	0	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	0	0	0	0	0
12.1	Civilian personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	0	0
22	Transportation of things	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental payments to others	0	0	0	0	0
23.3	Commun., util., misc. charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.2	Other goods and services from Federal sources	5,091	3,251	3,915	3,915	0
26	Supplies and materials	0	0	0	0	0
31	Equipment	0	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	**Total Obligations**	5,091	3,251	3,915	3,915	0

Department of Commerce
National Oceanic and Atmospheric Administration
North Pacific Observer Fund
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase/ Decrease from 2022 Base
Recoveries	(722)	0	0	0	0
Less unobligated balance, SOY	(2,157)	(723)	0	0	0
Plus unobligated balance, EOY	723	0	0	0	0
Unobligated balance, rescission	0	0	0	0	0
Total Budget Authority	2,935	2,528	3,915	3,915	0

Department of Commerce
National Oceanic and Atmospheric Administration
Oceanic and Atmospheric Research
Budget Estimates, Fiscal Year 2022

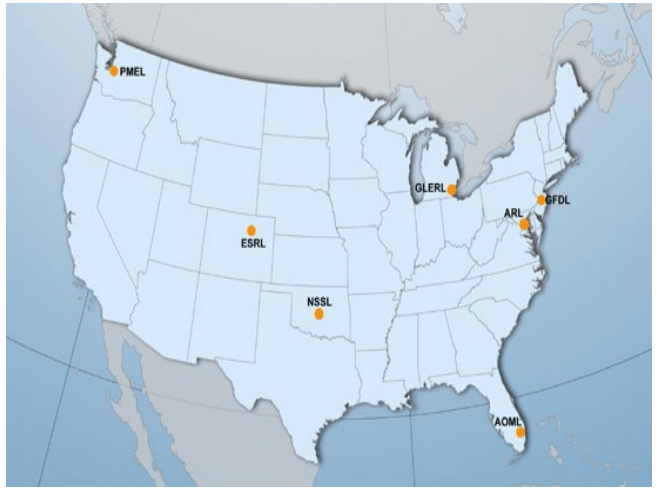
Executive Summary

For FY 2022, NOAA requests a total of $815,669,000 and 867 FTE/ 911 positions for the Office of Oceanic and Atmospheric Research including a net increase of $196,799,000 and 47 FTE/ 63 positions in program changes.

Oceanic and Atmospheric Research (OAR) is NOAA's central research Line Office charged with improving the understanding of changes in the Earth's environment. OAR integrates and conducts research across NOAA to advance NOAA's mission by providing better forecasts and improving understanding of the Earth and its processes. OAR conducts research on ocean acidification, aquaculture, severe weather, climate, and deep sea environments. OAR also develops technology that is transitioned into operations at other NOAA Line Offices or that improves the scope and efficiency of our observing systems. OAR also provides information to individuals, businesses, and communities to reduce vulnerability to extreme weather and climate, prepare for drought and water resource challenges, protect and preserve coasts and coastal infrastructure from inundation, and identify and manage risks to marine ecosystems and the services they provide.

OAR's Organizational Components:
OAR operates through a national network of laboratories, other university-based research institutes, and specialized programs. These centers of expertise collaborate across NOAA's weather, climate, and ocean research to apply an integrated approach to global and local scientific challenges. OAR consists of the following organizational components:

OAR Laboratories:
OAR has ten laboratories across the United States providing the research foundation for NOAA products and services that support decision making by policymakers and the public. These laboratories collaborate with numerous external partners, including NOAA-funded Cooperative Institutes at academic and scientific institutions.



Map displays the location of OAR's ten laboratories. There are four laboratories at the Earth System Research Laboratories location in Boulder. CO.

OAR's labs include:

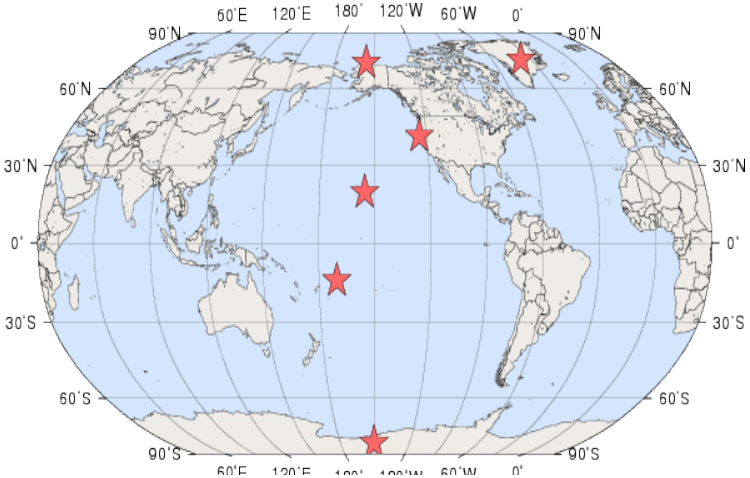
Air Resources Laboratory, College Park, Maryland
Air Resources Laboratory conducts research on atmospheric dispersion, atmospheric chemistry, climate composition, and the complex behavior of the atmosphere near the Earth's surface, providing weather forecasters' direct access to dispersion estimates of airborne hazardous materials to predict the transport of acid rain, volcanic ash, wildfires, air chemistry, mercury contamination, and radioactive material.

Atlantic Oceanographic and Meteorological Laboratory, Miami, Florida
Atlantic Oceanographic and Meteorological Laboratory conducts research that protects coastal populations and ecosystems with more accurate forecasting of hurricanes, better understanding of the role of oceans in climate, and protection from environmental degradation.

Earth System Research Laboratories, Boulder, Colorado
Four laboratories within Earth System Research Laboratories pursue a broad and comprehensive understanding of the Earth system, including the atmosphere, ocean, and the climate system.

Chemical Sciences Laboratory, Boulder Colorado
Chemical Sciences Laboratory focuses on quantifying manmade and natural emissions, understanding processes that alter the atmosphere's composition and the distribution of pollutants, and offering information and practical applications to local decision makers and the public.

Global Monitoring Laboratory, Boulder Colorado
Global Monitoring Laboratory sustains long-term observation of atmospheric compounds from over 100 sites around the world and identifies emerging trends in compound location and concentration. It also validates the NASA and NOAA satellite data of greenhouse gases, ozone, radiation, aerosols, and many other atmospheric compounds.



Among other observation networks, Global Monitoring Laboratory operates 6 Atmospheric Baseline Observatories, strategically located across the globe, that collect high quality, long-term atmospheric data used by more than 500 external partners and stakeholders.

Department of Commerce
National Oceanic and Atmospheric Administration
Oceanic and Atmospheric Research
Budget Estimates, Fiscal Year 2022

Global Systems Laboratory, Boulder Colorado
Global Systems Laboratory improves weather and water by developing and integrating next-generation Earth system models at storm-to-global scales and advances new modeling.

Physical Sciences Laboratory, Boulder Colorado
Physical Sciences Laboratory conducts physical science research that advances NOAA's abilities to observe, understand, and predict the physical behavior of the Earth system, improving forecasts and seasonal outlooks.

Geophysical Fluid Dynamics Laboratory, Princeton, New Jersey
Geophysical Fluid Dynamics Laboratory modeling research provides the foundation for our Nation's weather prediction, seasonal forecasting and ocean modeling.

Great Lakes Environmental Research Laboratory, Ann Arbor, Michigan
Great Lakes Environmental Research Laboratory develops information and tools for coastal decision makers managing 95 percent of our country's surface freshwater. GLERL advances forecasts of environmental change in the Great Lakes through environmental observation, ecosystem process studies, and integrated modeling.

National Severe Storms Laboratory, Norman, Oklahoma
National Severe Storms Laboratory focuses on understating the causes of severe weather, such as tornadoes, flash floods, hail, damaging winds, and winter weather, in order to improve the lead time and accuracy of severe weather forecasts and warnings.

Pacific Marine Environmental Laboratory, Seattle, Washington
Pacific Marine Environmental Laboratory explores the complex physical and geochemical processes operating in the world's oceans, including the processes driving ocean circulation and the global climate system.

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National Oceanic and Atmospheric Administration
Oceanic and Atmospheric Research
Budget Estimates, Fiscal Year 2022

NOAA Cooperative Institutes:

NOAA Cooperative Institutes (CIs) are long-term collaborations between NOAA and academic and scientific institutions dedicated to advancing oceanic and atmospheric research. CIs are co-located with one or more NOAA facilities to promote scientific exchange and technology transfer. Each CI is competitively selected to address a specific research theme within NOAA's mission, such as weather forecast improvement or ecosystem forecasting. These partnerships help maximize scientific breadth, quality, productivity, and return on investment. NOAA currently supports 15 CIs consisting of 69 universities and research institutions across 28 states, the District of Columbia, Puerto Rico, and the US Virgin Islands.

NOAA's Cooperative Institutes and their host institution are:

- CI for Climate, Ocean and Ecosystem Studies, University of Washington
- CI for Great Lakes Research, University of Michigan
- CI for Marine and Atmospheric Studies, University of Miami
- CI for Marine, Earth, and Atmospheric Systems, University of California, San Diego
- CI for Marine Resources Studies, Oregon State University
- CI for Mesoscale Meteorological Studies, University of Oklahoma
- CI for Meteorological Satellite Studies, University of Wisconsin
- CI for Modeling the Earth System, Princeton University
- CI for Research in Environmental Sciences, University of Colorado
- CI for Research in the Atmosphere, Colorado State University
- CI for Satellite Earth System Studies, University of Maryland, College Park
- CI for the North Atlantic Region, Woods Hole Oceanographic Institution
- Joint Institute for Marine and Atmospheric Research, University of Hawaii
- Northern Gulf Institute, Mississippi State University
- Ocean Exploration Cooperative Institute, University of Rhode Island

OAR Programs:

OAR Programs manage competitive and noncompetitive awards for intramural and extramural research that focus on specific topics and emerging areas of research. They also foster collaboration across NOAA, with other agencies, and academic institutions.

OAR's programs include:

Climate Program Office
CPO supports activities that advance our understanding of Earth's climate system and helps communities apply this knowledge to mitigate risks and improve community resilience and preparedness throughout the Nation.

Global Ocean Monitoring and Observing Program
Global Ocean Monitoring and Observing Program provides long-term, high quality, global ocean observations and information products to researchers, forecasters, and other stakeholders to inform and prepare society for environmental challenges.

National Sea Grant College Program
The National Sea Grant College Program is a Federal-state partnership that focuses on maintaining resilient communities and economies, sustainable fisheries and aquaculture, healthy coastal ecosystems, and environmental literacy and workforce development.

NOAA Ocean Acidification Program
The Ocean Acidification Program aims to improve understanding of how ocean chemistry is changing, how variable that change is by region, and how ocean acidification affects marine life, people, and the economy.

Ocean Exploration and Research
Ocean Exploration and Research, the only Federal program dedicated to ocean exploration, leads efforts to explore and characterize deep-water areas of the U.S. and other poorly known ocean areas so the Nation can successfully manage its oceanic resources.

Weather Program Office
Weather Program Office improves predictions and warnings for the public and weather sensitive U.S. industries by facilitating cutting-edge research and transitioning this research to National Weather Service (NWS) operations.

Department of Commerce
National Oceanic and Atmospheric Administration
Oceanic and Atmospheric Research
Budget Estimates, Fiscal Year 2022

Significant Adjustments:

Inflationary Adjustments
NOAA's FY 2022 Base includes a net increase of $8,990,000 and 0 FTE / 0 positions to account for the full funding requirement for certain inflationary adjustments to current programs for OAR activities. This includes the estimated 2022 civilian pay raise of 2.7 percent and military pay raise of 2.7 percent, as well as inflationary increases for labor and non-labor activities including benefits and rent charges from the General Services Administration.

Technical Adjustments
NOAA also requests the following transfers for a change of $0 and 0 FTE / 0 Positions to the agency:

From Office	Subactivity	To Office	Subactivity	Amount
OAR	Climate Laboratories and Cooperative Institutes (ORF)	OMAO	NOAA Commissioned Officer Corps (ORF)	$261,000 / 2 FTE / 2 Positions
OAR	Ocean Laboratories and Cooperative Institutes (ORF)	OMAO	NOAA Commissioned Officer Corps (ORF)	$390,000 / 3 FTE / 3 Positions
OAR	Ocean Exploration and Research (ORF)	OMAO	NOAA Commissioned Officer Corps (ORF)	$130,000 / 1 FTE / 1 Positions
OAR	Sustained Ocean Observations and Monitoring (ORF)	OMAO	NOAA Commissioned Officer Corps (ORF)	$130,000 / 1 FTE / 1 Positions

NOAA requests to transfer $261,000 and 2 FTE / 2 Positions from the Climate Laboratories and Cooperative Institutes Subactivity, $390,000 and 3 FTE / 3 Positions from the Ocean Laboratories and Cooperative Institutes Subactivity, $130,000 and 1 FTE / 1 Position from the Ocean Exploration and Research Subactivity, and $130,000 and 1 FTE / 1 Position from the Sustained Ocean Observations and Monitoring Subactivity to the OMAO NOAA Commissioned Officer Corps Subactivity to allow for better alignment of funding and greater transparency over the full cost of the NOAA Corps. With this transfer, funding for all NOAA Corps personnel will reside within OMAO. This increases efficiency within the program by reducing administrative burdens and allows NOAA to better manage personnel requirements consistent with the NOAA Corps Amendments Act of 2020.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
TRANSFER CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Climate Research
Subactivity: Climate Laboratories & Cooperative Institutes (ORF) transfer to OMAO NOAA Commissioned Officer Corps (ORF)

	Object Class	2021 Enacted	2022 Transfer	2022 Base
11.1	Full-time permanent compensation	21,490	0	22,070
11.3	Other than full-time permanent	668	0	668
11.5	Other personnel compensation	426	0	426
11.7	Military personnel compensation	261	(261)	0
11.9	Total personnel compensation	22,845	(261)	23,164
12	Civilian personnel benefits	7,400	0	7,600
13	Benefits for former personnel	0	0	0
21	Travel and transportation of persons	476	0	476
22	Transportation of things	556	0	556
23	Rent, communications, and utilitites	0	0	0
23.1	Rental payments to GSA	556	0	556
23.2	Rental Payments to others	256	0	256
23.3	Communications, utilities and misc charges	1,121	0	1,121
24	Printing and reproduction	132	0	132
25.1	Advisory and assistance services	885	0	885
25.2	Other services from non-Federal sources	11,373	0	11,743
25.3	Other goods and services from Federal sources	495	0	495
25.4	Operation and maintenance of facilities	0	0	0
25.5	Research and development contracts	59	0	59
25.6	Medical care	0	0	0
25.7	Operation and maintenance of equipment	0	0	0
25.8	Subsistence and support of persons	0	0	0
26	Supplies and materials	3,776	0	3,776
31	Equipment	2,839	0	2,839
32	Lands and structures	0	0	0
33	Investments and loans	0	0	0
41	Grants, subsidies and contributions	21,979	0	22,534
42	Insurance claims and indemnities	0	0	0
43	Interest and dividends	2	0	2
44	Refunds	0	0	0
99	Total obligations	74,750	(261)	76,194

*The 2022 Base column reflects the full 2022 base for the subactivity, including calculated ATBs.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
TRANSFER CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Ocean, Coastal, and Great Lakes Research
Subactivity: Ocean Laboratories & Cooperative Institutes (ORF) transfer to OMAO NOAA Commissioned Officer Corps (ORF)

	Object Class	2021 Enacted	2022 Transfer	2022 Base
11.1	Full-time permanent compensation	10,998	0	11,295
11.3	Other than full-time permanent	190	0	190
11.5	Other personnel compensation	115	0	115
11.7	Miltary personnel compensation	390	(390)	0
11.9	Total personnel compensation	11,693	(390)	11,600
12	Civilian personnel benefits	3,874	0	3,979
13	Benefits for former personnel	14	0	14
21	Travel and transportation of persons	287	0	287
22	Transportation of things	164	0	164
23	Rent, communications, and utilitites	0	0	0
23.1	Rental payments to GSA	0	0	0
23.2	Rental Payments to others	885	0	885
23.3	Communications, utilities and misc charges	185	0	185
24	Printing and reproduction	33	0	33
25.1	Advisory and assistance services	56	0	56
25.2	Other services from non-Federal sources	4,975	0	5,214
25.3	Other goods and services from Federal sources	16	0	16
25.4	Operation and maintenance of facilities	0	0	0
25.5	Research and development contracts	0	0	0
25.6	Medical care	0	0	0
25.7	Operation and maintenance of equipment	0	0	0
25.8	Subsistence and support of persons	0	0	0
26	Supplies and materials	2,386	0	2,386
31	Equipment	648	0	648
32	Lands and structures	0	0	0
33	Investments and loans	0	0	0
41	Grants, subsidies and contributions	10,882	0	11,241
42	Insurance claims and indemnities	0	0	0
43	Interest and dividends	0	0	0
44	Refunds	0	0	0
99	Total obligations	36,098	(390)	36,708

*The 2022 Base column reflects the full 2022 base for the subactivity, including calculated ATBs.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
TRANSFER CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Ocean, Coastal, and Great Lakes Research
Subactivity: Ocean Exploration and Research (ORF) transfer to OMAO NOAA Commissioned Officer Corps (ORF)

	Object Class	2021 Enacted	2022 Transfer	2022 Base
11.1	Full-time permanent compensation	2,705	0	2,778
11.3	Other than full-time permanent	88	0	88
11.5	Other personnel compensation	34	0	34
11.8	Special personnel services payments	130	(130)	0
11.9	Total personnel compensation	2,957	(130)	2,900
12	Civilian personnel benefits	1,048	0	1,076
13	Benefits for former personnel	0	0	0
21	Travel and transportation of persons	171	0	171
22	Transportation of things	1	0	1
23	Rent, communications, and utilitites	0	0	0
23.1	Rental payments to GSA	241	0	241
23.2	Rental Payments to others	3	0	3
23.3	Communications, utilities and misc charges	93	0	93
24	Printing and reproduction	0	0	0
25.1	Advisory and assistance services	3,236	0	3,411
25.2	Other services from non-Federal sources	2,527	0	2,527
25.3	Other goods and services from Federal sources	161	0	161
25.4	Operation and maintenance of facilities	0	0	0
25.5	Research and development contracts	0	0	0
25.6	Medical care	0	0	0
25.7	Operation and maintenance of equipment	0	0	0
25.8	Subsistence and support of persons	0	0	0
26	Supplies and materials	206	0	206
31	Equipment	29	0	29
32	Lands and structures	0	0	0
33	Investments and loans	0	0	0
41	Grants, subsidies and contributions	31,966	0	32,230
42	Insurance claims and indemnities	0	0	0
43	Interest and dividends	0	0	0
44	Refunds	0	0	0
99	Total obligations	42,639	(130)	43,049

*The 2022 Base column reflects the full 2022 base for the subactivity, including calculated ATBs.

Exhibit 3T

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
TRANSFER CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Ocean, Coastal, and Great Lakes Research
Subactivity: Sustained Ocean Observations & Monitoring (ORF) transfer to OMAO NOAA Commissioned Officer Corps (ORF)

	Object Class	2021 Enacted	2022 Transfer	2022 Base
11.1	Full-time permanent compensation	3,162	0	3,248
11.3	Other than full-time permanent	48	0	48
11.5	Other personnel compensation	65	0	65
11.8	Special personnel services payments	130	(130)	0
11.9	Total personnel compensation	3,405	(130)	3,361
12	Civilian personnel benefits	1,086	0	1,115
13	Benefits for former personnel	0	0	0
21	Travel and transportation of persons	138	0	138
22	Transportation of things	273	0	273
23	Rent, communications, and utilitites	0	0	0
23.1	Rental payments to GSA	80	0	80
23.2	Rental Payments to others	1	0	1
23.3	Communications, utilities and misc charges	245	0	245
24	Printing and reproduction	6	0	6
25.1	Advisory and assistance services	1,145	0	1,145
25.2	Other services from non-Federal sources	2,083	0	2,244
25.3	Other goods and services from Federal sources	177	0	177
25.4	Operation and maintenance of facilities	0	0	0
25.5	Research and development contracts	0	0	0
25.6	Medical care	0	0	0
25.7	Operation and maintenance of equipment	0	0	0
25.8	Subsistence and support of persons	0	0	0
26	Supplies and materials	552	0	552
31	Equipment	737	0	737
32	Lands and structures	0	0	0
33	Investments and loans	0	0	0
41	Grants, subsidies and contributions	35,134	0	35,374
42	Insurance claims and indemnities	0	0	0
43	Interest and dividends	1	0	1
44	Refunds	0	0	0
99	Total obligations	45,063	(130)	45,449

*The 2022 Base column reflects the full 2022 base for the subactivity, including calculated ATBs.

Department of Commerce
National Oceanic and Atmospheric Administration
PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS
(Dollar amounts in thousands)

		2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
OCEANIC AND ATMOSPHERIC RESEARCH (OAR)											
Climate Research	Pos/BA	265	168,852	293	180,652	291	183,365	337	293,713	46	110,348
	FTE/OBL	254	167,590	283	180,652	281	183,365	316	293,713	35	110,348
Weather & Air Chemistry Research	Pos/BA	249	133,808	300	138,691	300	141,379	308	151,570	8	10,191
	FTE/OBL	222	133,354	292	138,691	292	141,379	298	151,570	6	10,191
Ocean, Coastal, and Great Lakes Research	Pos/BA	210	227,583	244	230,148	239	232,599	244	294,859	5	62,260
	FTE/OBL	193	226,507	235	230,148	230	232,599	233	294,859	3	62,260
Innovative Research & Technology	Pos/BA	12	16,706	17	17,800	17	18,027	21	22,027	4	4,000
	FTE/OBL	12	17,049	16	17,800	16	18,027	19	22,027	3	4,000
TOTAL OAR - ORF	**Pos/BA**	**736**	**546,949**	**854**	**567,291**	**847**	**575,370**	**910**	**762,169**	**63**	**186,799**
	FTE/OBL	**681**	**544,500**	**826**	**567,291**	**819**	**575,370**	**866**	**762,169**	**47**	**186,799**
Systems Acquisition	Pos/BA	0	41,931	1	43,500	1	43,500	1	53,500	0	10,000
	FTE/OBL	1	42,132	1	43,500	1	43,500	1	53,500	0	10,000
TOTAL OAR - PAC	**Pos/BA**	**0**	**41,931**	**1**	**43,500**	**1**	**43,500**	**1**	**53,500**	**0**	**10,000**
	FTE/OBL	**1**	**42,132**	**1**	**43,500**	**1**	**43,500**	**1**	**53,500**	**0**	**10,000**
TOTAL OAR	**Pos/BA**	**736**	**588,880**	**855**	**610,791**	**848**	**618,870**	**911**	**815,669**	**63**	**196,799**
	FTE/OBL	**682**	**586,632**	**827**	**610,791**	**820**	**618,870**	**867**	**815,669**	**47**	**196,799**

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Climate Research

Goal Statement

The mission of the Climate Research in OAR is to monitor and understand Earth's climate system to predict potential changes in global climate, as well as understand and communicate to the public and decision-makers near-term, regional climate variations that are of societal and economic importance. The long-term observing, monitoring, research, and modeling capabilities performed in OAR's Climate Research provide the science that Americans need to understand how, where, and when Earth's conditions are changing.

Base Program

OAR's climate research laboratories, programs, and partners are key contributors to advancing understanding of Earth's climate system through interdisciplinary, integrated scientific research, and leveraging the resulting knowledge, data, and systems to enhance society's ability to plan and respond to climate variability and climate change. NOAA's Climate Program Office (CPO) network of partners, specialists, and principal investigators are working to integrate and transition research findings from CPO-sponsored research and development projects into applications designed to help communities and businesses build resilience to climate-related impacts and extreme events.

NOAA's competitive research programs funds climate science, assessments, decision support research, modeling improvements, and transition of research and capacity-building activities in four complementary and important areas:

- Observations and monitoring
- Process understanding and analysis
- Modeling, predictions, and projections
- Societal interactions and communications

The following three Subactivities are included in the Climate Research Portfolio:

- *Laboratories & Cooperative Institutes*: OAR's Laboratories and Cooperative Institutes primarily support Earth System science research, modeling, and technology development and maintain long-term atmospheric observation networks and

infrastructure, including a network of tall towers and the Atmospheric Baseline Observatories which collect data on the atmosphere's composition.

- *Regional Climate Data & Information*: OAR supports activities that improve resilience and preparedness throughout the Nation with research that advances our understanding of climate-related risks and vulnerabilities across sectors and regions and with the development of tools to enable more informed decision making.
- *Climate Competitive Research*: OAR funds high-priority climate science through a competitive selection process to advance understanding of the Earth's climate system and climate impacts on society.

NOAA's climate research activities are authorized under the *National Climate Program Act* (15 U.S.C. §§ 2901-2908), the *Global Change Research Act* (15 U.S.C. §§ 2921-2961), the *Weather Research and Forecasting Innovation* Act (15 U.S.C. § 8501), and the *National Integrated Drought Information System Reauthorization Act* (P.L. 115-423; 15 U.S.C. § 8511-8521).

Statement of Operating Objectives

Schedule and Milestones:
FY 2022-2026
Laboratories and Cooperative Institutes

- Publish updates on Annual Greenhouse and Ozone Depleting Gas Indices
- Apply new Earth system modeling for tipping point prediction in global estuarine, coastal, and benthic ecosystems
- Deploy and maintain an array of 1,200 surface drifters
- Maintain and augment 38 moorings that measure carbon dioxide and ocean acidification
- Complete 1-2 cruises that will collect important ocean chemistry data while servicing moorings and collecting information on coastal and deep ocean currents
- Long term global records of greenhouse gases, stratospheric ozone, and aerosols

Regional Climate Data & Information

- Improve drought indicators and indices in support of the Regional Drought Early Warning Information System
- Conduct climate training for tribal communities in the Southern U.S.
- Lead and support the quadrennial National Climate Assessment and the Scientific Assessment of Ozone Depletion, under the Montreal Protocol on Substances that Deplete the Ozone Layer
- Test experimental drought indicators based on decision making needs in the NIDIS Pilot regions

Climate Competitive Research

- Expand Earth system data collection for cryospheric, boundary layer properties, hydrometeorological, and oceanic process studies
- Increase, from two to five, the cumulative number of science-based adaptation tools and technologies that are used by NOAA partners and stakeholders to improve ecosystem-based management of fisheries

Deliverables:

Laboratories and Cooperative Institutes

- Long term global records of atmospheric compounds, up to 55 trace gases, stratospheric ozone, aerosols, and surface radiation
- Updated status of South Pole Ozone hole

Regional Climate Data & Information

- Forty total interoperable drought systems accessible through the U.S. Drought Portal
- Increased skill and capacity among stakeholders in businesses and communities to build resilience to climate-related impacts
- Climate training workshops and reports directed to the needs of resource managers

Climate Competitive Research

- Supported projects, ranging from advancing the understanding and prediction of drought to building resilience in coastal communities, conducted by universities, other research institutions, and other Federal agencies

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(Dollar amounts in thousands)

Explanation and Justification

Line Item		2020 Actual		2021 Enacted		2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Laboratories & Cooperative Institutes (Climate Research)	Pos/BA	194	66,343	209	74,750	207	76,194
	FTE/OBL	186	66,923	204	74,750	202	76,194
Regional Climate Data & Information	Pos/BA	27	39,831	28	42,107	28	42,583
	FTE/OBL	26	39,505	26	42,107	26	42,583
Climate Competitive Research	Pos/BA	44	62,678	56	63,795	56	64,588
	FTE/OBL	42	61,162	53	63,795	53	64,588
Total Climate Research	Pos/BA	265	168,852	293	180,652	291	183,365
	FTE/OBL	254	167,590	283	180,652	281	183,365

During 2020, the United States experienced 22 weather/climate disaster events with losses exceeding $1 billion each to affect the United States. These events included 1 drought event, 13 severe storm events, 7 tropical cyclone events, and 1 wildfire event. Overall, these events resulted in the deaths of 262 people and had significant economic effects on the areas impacted. Calendar year 2020 sets the new annual record of 22 events - shattering the previous annual record of 16 events that occurred in 2011 and 2017. Moreover, 2020 is the sixth consecutive year (2015-2020) in which 10 or more billion-dollar weather and climate disaster events have impacted the United States. OAR science has been at the forefront of improving our understanding of the causes of extremes, characterizing the drivers of predictability of extremes, and improving the prediction of extremes across timescales. OAR scientists have worked to understand the drivers of tropical cyclone variability and change over time; how severe weather is modulated by climate phenomena such as the El Niño Southern Oscillation and Madden Julian Oscillation; how winter storms are responding to changes in the winter jet stream and water vapor in the atmosphere; how drought varies in response to remote and local climate influences; and how wildfires relate to meteorology, changes in the land surface, and drought. OAR's scientists and funding programs have worked to advance not only the understanding of these events but also our ability to predict them farther in

advance to mitigate impacts on lives and property, and monitor them to better describe their evolution and magnitude. Extensive work over the past few years has deepened our understanding of the mechanisms that control Subseasonal to Seasonal (S2S) phenomena, which has, for example, advanced our understanding of Atmospheric Rivers and their predictability on S2S timescales, and transitioned an operational capability to provide S2S forecasts to the Climate Prediction Center.

The distribution of damage from U.S. Billion-dollar disaster events from 1980 to 2020 is dominated by tropical cyclone losses. Tropical cyclones have caused the most damage ($997.3 billion, CPI-adjusted) and also have the highest average event cost ($19.2 billion per event, CPI-adjusted). Drought ($258.9 billion, CPI-adjusted), severe storms ($286.3 billion, CPI-adjusted) and inland flooding ($151.0 billion, CPI-adjusted) have also caused considerable damage based on the list of billion-dollar events. Severe storms have caused the highest number of billion-dollar disaster events (128), while the average event cost is the lowest ($2.2 billion, CPI-adjusted). Tropical cyclones and flooding represent the second and third most frequent event types (52 and 33), respectively. Tropical cyclones are responsible for the highest number of deaths (6,593), followed by drought/heatwave events (3,910) and severe storms (1,762).[1]

[1] NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2021). https://www.ncdc.noaa.gov/billions/, DOI: 10.25921/stkw-7w73

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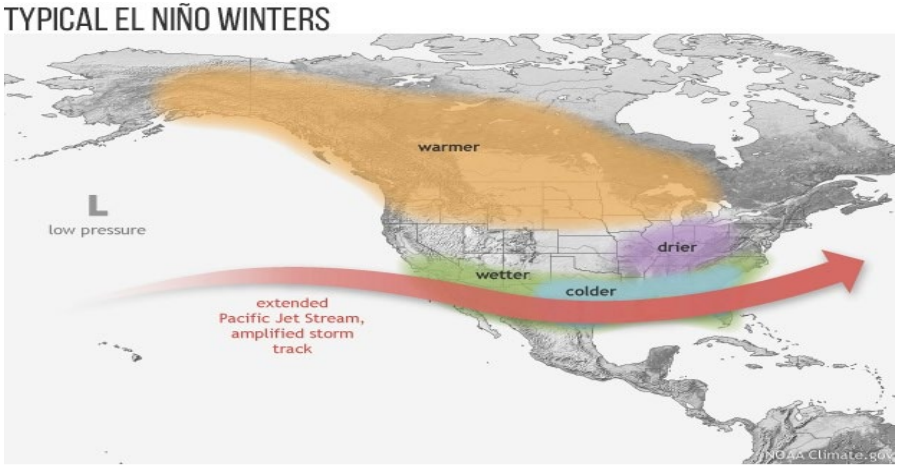
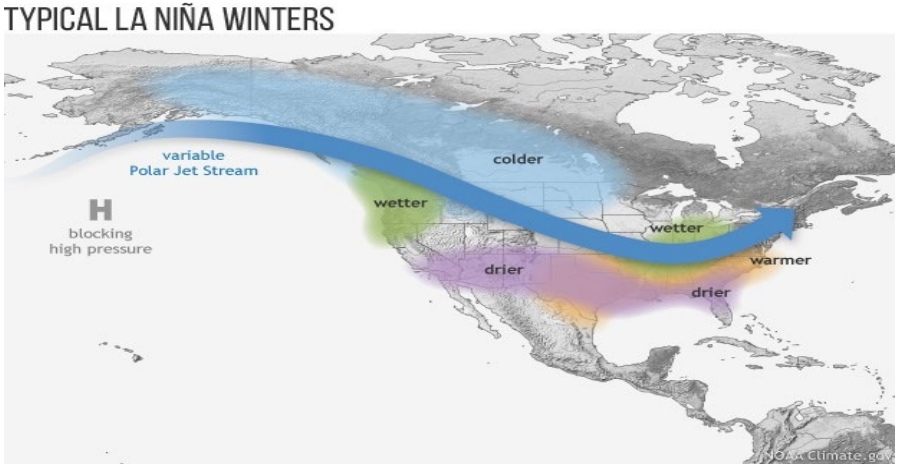
(Dollar amounts in thousands)

Climate Research continues to sustain its investments and partnerships in global ocean observation and monitoring systems and participated in scientific field campaigns, like "Years of the Maritime Continent" — a 2-year joint research project to improve understanding and prediction of variability over the Indo-Pacific Ocean region, and how that influences weather patterns around the world. Climate Research has advanced use of autonomous robotic ocean profiling instruments such as Deep Argo and saildrones. Ocean observations led to assessments of ocean acidification impacts to coral reefs and fisheries and to sea level change risks that improved coastal community preparedness. Climate Research-sponsored field campaigns also conducted research on impacts to air quality from urban emissions and wildfires, which can adversely impact human health and the nation's economy due to reduced productivity. In its continuing efforts to help bolster the nation's economy and meet stakeholders' need for science-based decision support, Climate Research enhanced its Regional Drought Early Warning Systems and expanded its online "Climate Explorer" tool, whereby decision makers can access maps and graphs of downscaled climate projections of decision-relevant variables for their county, like the annual numbers of days above or below critical temperature, precipitation, and high-tide flooding thresholds. Similar tools were developed to improve heat risk information and address other health impacts.





NOAA Climate Research

OAR's Climate Research is collaborative and crosscutting and therefore is often funded through multiple Subactivities. Some cross-cutting themes include:

Global Observations
To better document and understand global processes, OAR provides an array of observational capabilities. For example, OAR's four Atmospheric Baseline Observatories have been collecting 250 measurements of atmospheric trends for over 50 years such that measurements conducted in the 1960s are exactly comparable to those made today and 100 years from now. These observations and supplemental measurements help identify trends and anomalies in the atmosphere, like radioactive dust releases and transport of mercury in the air from China to the U.S., and their impacts. With this information, decision-makers are better able to address global atmospheric challenges. For example, OAR's long-term and on-going measurements of ozone, UV, and ozone-depleting compounds help policymakers identify successes and needs to repair the ozone layer. OAR also supports the Global Ocean Observing System including the drifting buoy network, Argo profiling floats, tropical moored arrays in the Atlantic, and ocean carbon networks, and continually researches new climate observing strategies.

Predicting Future Change
OAR's Climate Research predicts future change to inform decision making. The Earth System comprises many physical, chemical and biological processes that need to be dynamically integrated to better predict their behavior over scales from local to global and periods of minutes to millennia. OAR research produces state-of-the-art models of the Earth System to better predict climate extremes and variability impacting the U.S., such as changes in the risk for heavy rainfall and snow events during an El Niño, frequency of high-impact weather events, and ocean dynamics like the Meridional Overturning Circulation.

Assessing Impacts
OAR Climate Research provides in-depth analysis of climate change impacts on the United States. OAR assesses the multitude of ways climate change is already affecting and will increasingly affect the lives of Americans. For example, the National Climate Assessment details the changes various geographic regions and economic sectors are experiencing and can expect to experience in the future. Past assessments have included studies of how climate impacts tornadoes, sea level, and drought. This research is pointing to more effective ways to meet environmental management and policy goals while avoiding costly overregulation.

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JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

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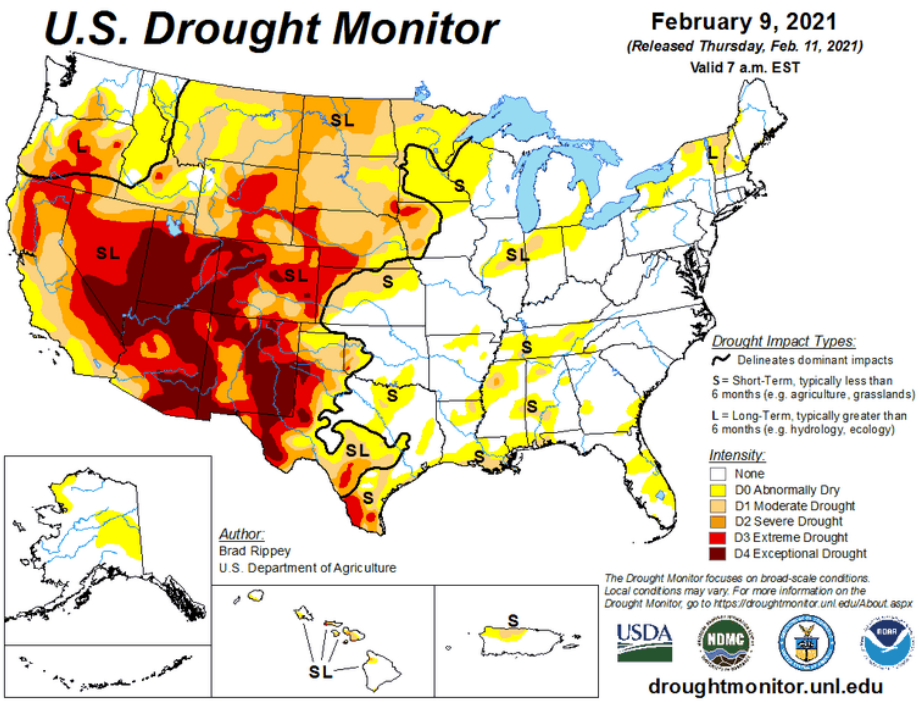

The U.S. Drought Monitor (pictured above) is a weekly map based on measurements of climatic, hydrologic, and soil conditions as well as reported impacts and observations collected from more than 350 contributors around the U.S.

Supporting Decisions

OAR Climate Research also delivers resources and tools to foster resilience and preparedness throughout the U.S. and abroad, across sectors and regions. In particular, the NOAA-led NIDIS, established by the *National Integrated Drought Information System Act of 2006* and amended in the *National Integrated Drought Information System Reauthorization Act of 2018*, provides accessible drought information for the Nation through improved drought monitoring and forecasting capabilities. In addition, the NOAA Climate.gov Portal provides easy public access to NOAA and its partners' climate data and information services. Climate.gov also hosts and supports the U.S. Climate Resilience Toolkit (toolkit.climate.gov).

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(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Climate Laboratories and Cooperative Institutes	Pos./BA	207	76,194	212	96,194	5	20,000
	FTE/Obl.	202	76,194	206	96,194	4	20,000

Sustained Atmospheric Observations Increase (+$20,000, 4 FTE/ 5 Positions) – NOAA proposes an increase to support and enhance its atmospheric observing systems, which will allow NOAA to support, as a requirement of the Paris Agreement, a Global Stocktake.

NOAA's scientific capabilities can be used to uniquely support the Global Stocktake. This requested increase would better enable the U.S. role in this by: 1) creating an independent, transparent evaluation of greenhouse gas (GHG) emissions and changes in emissions at various scales; 2) providing a robust understanding of the allowable cumulative GHG emissions to limit global warming at different future levels by taking into account likely changes in natural GHG sinks, sources in the ocean, land and atmosphere; and 3) examining the biogeochemical-climate feedbacks and the resulting climate sensitivity. NOAA will coordinate with other Federal partners to conduct GHG measurement and modeling and competitively utilize and incorporate expertise from the extramural research community to help quantify actual emissions, and assess carbon-climate feedbacks and the magnitude of permissible emissions to support the U.S. government in implementing its commitments towards mitigation of climate change.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022 - FY 2026

- Rebuild and enhance regional GHG observing systems with more sites, more samples per site, and higher temporal resolution to better enable regional to continental monitoring of emissions across the U.S. (FY 2022)
- Rebuild and enhance global GHG observing system to reinvigorate baseline Global Greenhouse Gas Reference Network and fill observational gaps in the tropics, Arctic, and oceans (FY 2022)
- Initiate transformative network development to enable a step change in data analysis and spatial and temporal sampling of GHGs for satellite, model and emissions evaluations using new sampling platforms, multi-species measurement systems and process studies to both understand and improve GHG sampling algorithms (FY 2022)

- Develop and apply enhanced Earth-system models to inform policy makers about the feasibility and implications of meeting or not meeting different future climate targets including those under the Paris Agreement, as well as to assess the climate effects of different mitigation strategies (FY 2022-2026)
- Build out a transformative measurement network to enhance network detectability by using commercial aircraft, fossil fuel tracers, boundary layer supersites for model and satellite evaluation and process understanding (FY 2023-2026)
- Develop near-real time GHG data assimilation system coupled with NOAA Unified Forecasting System transport to provide global to local 4-D estimates of atmospheric GHG concentrations, emissions and sinks (FY 2023-2026)

Deliverables:
FY 2022 - FY 2026

- Expand GHG network in spatial and temporal extent and resolution through enhancements in ground, tower, aircraft and balloon borne measurements within the U.S. continental and globally
- Reduce GHG measurement cost, footprint and manpower while preserving accuracy and precision to operationalize GHG measurements on multiple platforms
- Improve process understanding leading to reduced uncertainties in estimates of natural and manmade emissions through multi-tracer studies using atmospheric data
- Reduce uncertainty in modeling systems in simulating Earth's climate as measured by reduced bias and improved simulation of modes of variability when compared against data
- Reduce model and satellite retrieval biases through comparisons with direct measurements of GHGs in the atmosphere
- Demonstrate observation-based data assimilation system for GHG emissions estimates from local to global scales for decision makers through enhancements in sampling and modeling methodology
- Improve stakeholder engagement through data visualization and data assimilation products

Department of Commerce
National Oceanic and Atmospheric Administration
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(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Annual number of measurement days with aircraft and at ground-based and tall-tower sites distributed across the continental US and globe that enhance accuracy and resolution of GHG emissions estimates					
With Increase	8500	9500	11000	12000	15000
Without Increase	7500	7200	7000	6800	6500
Annual number of downloads of GHG emissions estimates that help decision makers evaluate effectiveness and suitability of mitigation strategies at local to global scales					
With Increase	200	300	400	400	400
Without Increase	100	100	100	100	100
Number of studies detailing trends and variability in natural GHG sources and sinks to be considered in reassessing target emissions initiatives					
With Increase	1	3	4	4	4
Without Increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	20,000	20,000	20,000	20,000	20,000
Capitalized	9,213	9,213	9,213	9,213	9,213

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(Dollar amounts in thousands)

Uncapitalized	10,787	10,787	10,787	10,787	10,787
Budget Authority	20,000	20,000	20,000	20,000	20,000
Outlays	12,400	12,400	12,400	12,400	12,400
FTE	4	5	5	5	5
Positions	5	5	5	5	5

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Climate Research
Subactivity: Climate Laboratories and Cooperative Institutes
Program Change: Sustained Atmospheric Observations Increase

Title		Grade	Number	Annual Salary	Total Salaries
Physical Scientist		ZP-V	1	140,428	$140,428
Physical Scientist		ZP-IV	2	101,028	$202,056
Physical Scientist		ZP-IV	1	103,690	$103,690
Physical Scientist		ZP-IV	1	106,471	$106,471
Total			5		$552,645
Less lapse	25.00%		(1)		(138,161)
Total full-time permanent (FTE)			4		414,484
2022 Pay Adjustment (2.7%)					11,191
					425,675

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	4
Total FTE	4
Authorized Positions:	
Full-time permanent	5
Total Positions	5

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Climate Research
Subactivity: Climate Laboratories & Cooperative Institutes

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	21,277	21,490	22,070	22,496	426
11.3	Other than full-time permanent	668	668	668	668	0
11.5	Other personnel compensation	426	426	426	426	0
11.7	Military personnel Compensation	276	261	0	0	0
11.9	Total personnel compensation	22,647	22,845	23,164	23,590	426
12	Civilian personnel benefits	7,327	7,400	7,600	7,728	128
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	476	476	476	476	0
22	Transportation of things	556	556	556	556	0
23	Rent, communications, and utilitites	0	0	0	5	5
23.1	Rental payments to GSA	556	556	556	556	0
23.2	Rental Payments to others	256	256	256	872	616
23.3	Communications, utilities and misc charges	1,121	1,121	1,121	1,121	0
24	Printing and reproduction	132	132	132	142	10
25.1	Advisory and assistance services	885	885	885	885	0
25.2	Other services from non-Federal sources	8,351	11,373	11,743	12,943	1,200
25.3	Other goods and services from Federal sources	495	495	495	495	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	59	59	59	1,661	1,602
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	4	4
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	3,776	3,776	3,776	4,699	923
31	Equipment	2,839	2,839	2,839	9,250	6,411
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	17,445	21,979	22,534	31,209	8,675
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	2	2	2	2	0
44	Refunds	0	0	0	0	0
99	Total obligations	66,923	74,750	76,194	96,194	20,000

Department of Commerce
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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Climate Laboratories and Cooperative Institutes	Pos./BA	207	76,194	227	86,194	20	10,000
	FTE/Obl.	202	76,194	217	86,194	15	10,000

Global-Nested High-Resolution Model Increase (+$10,000, 15 FTE/ 20 Positions) – NOAA proposes an increase to develop a global-high-resolution atmospheric model with a 3km or below resolution to improve NOAA's understanding and prediction of extreme events on all time scales beginning at 2 weeks.

Since 1980, the U.S. has sustained over $1.75 trillion in weather and climate disasters (inflation adjusted).[2] Many of these damaging events are driven by intense hurricanes, hydroclimate events (e.g., atmospheric rivers), and 'bomb' cyclones and severe storms, including hail storms and tornadoes. Improved forecasts of such events can help reduce damage and loss of life through improved planning, preparation, and responses of emergency managers. Thus, there is a critical societal need for improved prediction of extreme weather. This initiative will enable development of a global model with a 3km or below nest aimed at improving understanding and prediction of extreme events on time scales up to 2 weeks. The inclusion of an observational program for boundary layer and clouds will further improve forecasting skill for extreme weather events with earlier warnings and more accurate spatial patterns.

NOAA is at the threshold of attaining spatial scales with Finite-Volume Cubed-Sphere Dynamical Core (FV3)-based Global Forecast System (GFS) that can deliver improved forecasts of extreme weather events. Through this initiative, NOAA will capitalize on computing and modeling developments, which as indicated by prototype modeling in the research phase, are expected to lead to improved forecasts of these events.

Research is a core capability of NOAA. This request will help NOAA meet the Administration's climate research goals, including EO 14008, and is critical to ensuring NOAA produces research data, tools, and information products that are publically accessible to facilitate climate change decision-making Nation-wide.

[2] https://www.ncdc.noaa.gov/billions/

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(Dollar amounts in thousands)

Schedule and Milestones:

FY 2022

- Make improvements to forecasting skill for extreme weather events with earlier warnings, more accurate spatial pattern of the extreme events, and higher fidelity in timing, occurrence, and duration of severe weather

FY 2023 - FY 2026

- Enable dynamical operational forecasts of extreme weather events in many regions of the world with a state-of-the-art grid resolution prediction system
- Increase NOAA's predictive capacity geographically for such events, in addition to expected improved predictive capabilities over the contiguous U.S.
- Provide the first real-time convective-scale medium-range forecasts over the continental U.S. and more generally extended-range prediction of extreme events

Deliverables:

- Increase staffing capacity in Global-Nested High-Resolution Modeling so that NOAA can invest in intramural research to improve numerical weather and climate prediction.
- Conduct Federal funding opportunities to advance research in Global-Nested High-Resolution Modeling
- Develop a global atmospheric model with a 3km or below nest, aimed at understanding and predicting extreme events at timescales up to 2 weeks
- Improve cloud microphysics, atmospheric boundary layer, and surface processes, including land-atmosphere interactions and fire emissions, in NOAA's GFS model (GFSv16)
- Capture multiple extremes of significance for the US (e.g., intense landfalling hurricanes, west coast hydroclimate, 'bomb' cyclones along the US east coast, and central US severe storms)
- Provide model output data and products in real-time to public and downstream users

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Performance Measures	2022	2023	2024	2025	2026
Model resolution globally/over continental U.S.					
With Increase	13/13 km	8.5/8.5 km	8.5/3 km	6.5/3 km	6.5/2 km
Without Increase	13/13 km	11/11 km	11/11 km	11/11 km	8.5/8.5 km
Lead time for explicit severe storm outbreak prediction (from this model)					
With Increase	n/a	n/a	5 days	7 days	7 days
Without Increase	n/a	n/a	n/a	n/a	n/a
# of New/upgraded parameterizations (each year)					
With Increase	1	2	3	2	3
Without Increase	1	2	1	2	2
Outyear Costs:					
Direct Obligations	10,000	10,000	10,000	10,000	10,000
Capitalized	5,620	5,620	5,620	5,620	5,620
Uncapitalized	4,380	4,380	4,380	4,380	4,380

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Budget Authority	10,000	10,000	10,000	10,000	10,000
Outlays	6,200	6,200	6,200	6,200	6,200
FTE	15	20	20	20	20
Positions	20	20	20	20	20

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PROGRAM CHANGE PERSONNEL DETAIL

Activity: Climate Research
Subactivity: Climate Laboratories and Cooperative Institutes
Program Change: Global Nested High Resolution Increase

Title		Grade	Number	Annual Salary	Total Salaries
Research Physical Scientist		ZP-III	3	74,702	$224,106
Research Physical Scientist		ZP-IV	3	106,471	$319,413
Computational Scientist		ZP-IV	2	106,471	$212,942
Meteorologist		ZP-III	2	74,702	$149,404
Meteorologist		ZP-IV	1	106,471	$106,471
Project Scientist		ZP-III	3	74,702	$224,106
Research Physical Scientist		ZP-III	2	68,864	$137,728
Research Physical Scientist		ZP-III	3	70,883	$212,649
Meteorologist		ZP-III	1	69,684	$69,684
Total			20		$1,656,503
Less lapse	25.00%		(5)		(414,126)
Total full-time permanent (FTE)			15		1,242,377
2022 Pay Adjustment (2.7%)					33,544
					1,275,921

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	15
Total FTE	15
Authorized Positions:	
Full-time permanent	20

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Climate Research
Subactivity: Climate Laboratories & Cooperative Institutes

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	21,277	21,490	22,070	23,346	1,276
11.3	Other than full-time permanent	668	668	668	668	0
11.5	Other personnel compensation	426	426	426	466	40
11.7	Military personnel compensation	276	261	0	0	0
11.9	Total personnel compensation	22,647	22,845	23,164	24,480	1,316
12	Civilian personnel benefits	7,327	7,400	7,600	7,995	395
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	476	476	476	576	100
22	Transportation of things	556	556	556	556	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	556	556	556	556	0
23.2	Rental Payments to others	256	256	256	256	0
23.3	Communications, utilities and misc charges	1,121	1,121	1,121	1,121	0
24	Printing and reproduction	132	132	132	142	10
25.1	Advisory and assistance services	885	885	885	885	0
25.2	Other services from non-Federal sources	8,351	11,373	11,743	17,243	5,500
25.3	Other goods and services from Federal sources	495	495	495	495	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	59	59	59	59	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	3,776	3,776	3,776	3,976	200
31	Equipment	2,839	2,839	2,839	2,959	120
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	17,445	21,979	22,534	24,893	2,359
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	2	2	2	2	0
44	Refunds	0	0	0	0	0
99	Total obligations	66,923	74,750	76,194	86,194	10,000

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(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Regional Climate Data & Information	Pos./BA	28	42,583	31	52,583	3	10,000
	FTE/Obl.	26	42,583	28	52,583	2	10,000

Enhancing Regional and Community Resilience by Scaling Up RISA Program and "Climate-Smart" Communities Initiative (+$10,000, 2 FTE/ 3 Positions) – NOAA proposes an increase to work with regions and communities towards lasting and equitable climate resilience. The proposal builds on and extends the proven capabilities of the Regional Integrated Sciences and Assessments (RISA) program and the U.S. Climate Resilience Toolkit (USCRT) to advance adaptation measures and resilience planning at regional and local scales, while prioritizing environmental justice.

Through this initiative, NOAA will expand the RISA program, while providing more robust support for those regions already benefitting from a RISA team. The RISA program will add two additional regional teams, while supporting cross-network activities, more in-depth research into key climate risks and adaptation approaches tailored to the regions, and seed activities in additional geographies. NOAA will coordinate closely with non-Federal partners and other Federal agencies, including the Departments of the Interior and Agriculture, to ensure its efforts are not duplicative and are appropriately targeted and scaled.

NOAA further proposes a new public-private partnership, the Climate-Smart Communities Initiative, to scale up and accelerate training and the pace of resilience-building in communities across the Nation utilizing the USCRT. This initiative will engage with and help train 20 cities around the Nation, and will factor in the opportunity to address environmental justice issues within these communities when determining how communities are selected. Communities that engage in this initiative will be supported in better positioning themselves to identify their climate information needs, vulnerabilities, risks, and potential resiliency solutions, and thus may turn to RISA or other activities for more in-depth analysis and tailored support.

There is an increasing need for NOAA to create and foster natural and economic resilience through support, expertise and robust, on-the-ground partnerships and place-based conservation activities. Ecological restoration and community resilience, as outlined in EO 14008, are integral to NOAA and the Administration's climate strategy.

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(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022
- Execute a competition for two additional RISA regions and support network activities connecting regions around national priorities
- Launch engagement with 20 communities with USCRT-based Climate-Smart Communities Initiative

FY 2023 – FY 2026
- Further expand the RISA program consistent with NOAA's goal of achieving robust nation-wide coverage
- Grow to 50 the cohort of communities engaged in Climate-Smart Communities Initiative

Deliverables
- Develop regional networks of scientists and decision makers working together to co-generate tailored research and products, including regional climate and risk assessments, focused on key climate risks for the region (e.g., coastal inundation, extreme heat, and water resource stress), and the decision needs of vulnerable and underserved communities
- Enhance climate-ready workforce trained in risk assessment, resiliency and adaptation planning, and climate science communication
- Support NOAA research activities and strategies informed by specific user needs at the regional and community level

Performance Measures	2022	2023	2024	2025	2026
Cumulative number of RISA teams to provide comprehensive, nationwide research, partnerships and services to stakeholders.					
With Increase/Decrease	13	13	13	13	13
Without Increase/Decrease	11	11	11	11	11

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Performance Measures

Cumulative number of Climate-Smart communities enabled for resilience planning					
With Increase/Decrease	20	50	75	100	100
Without Increase/Decrease	1	1	1	1	1
Outyear Costs:					
Direct Obligations	10,000	10,000	10,000	10,000	10,000
Capitalized	710	710	710	710	710
Uncapitalized	9,290	9,290	9,290	9,290	9,290
Budget Authority	10,000	10,000	10,000	10,000	10,000
Outlays	6,200	6,200	6,200	6,200	6,200
FTE	2	3	3	3	3
Positions	3	3	3	3	3

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PROGRAM CHANGE PERSONNEL DETAIL

Activity: Climate Research
Subactivity: Regional Climate Data & Information
Program Change: Enhancing Regional and Community Resilience by Scaling Up RISA Program and "Climate-Smart" Communities Initiative

Title		Grade	Number	Annual Salary	Total Salaries
Program Director (RISA)		ZA-V	1	144,128	$144,128
Program Manager (RISA)		ZA-III	1	72,750	$72,750
Program Manager (Climate Smart)		ZA-III	1	72,750	$72,750
					$0
Total			3		$289,628
Less lapse	25.00%		(1)		(72,407)
Total full-time permanent (FTE)			2		217,221
2022 Pay Adjustment (2.7%)					5,865
					223,086

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	2
Total FTE	2
Authorized Positions:	
Full-time permanent	3
Total Positions	3

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Climate Research
Subactivity: Regional Climate Data & Information

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	2,043	2,063	2,119	2,342	223
11.3	Other than full-time permanent	127	127	127	127	0
11.5	Other personnel compensation	11	11	11	11	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	2,181	2,201	2,257	2,480	223
12	Civilian personnel benefits	767	775	796	863	67
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	75	75	75	75	0
22	Transportation of things	8	8	8	8	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	270	270	270	270	0
23.2	Rental Payments to others	33	33	33	33	0
23.3	Communications, utilities and misc charges	34	34	34	34	0
24	Printing and reproduction	15	15	15	15	0
25.1	Advisory and assistance services	2,640	3,155	3,235	3,235	0
25.2	Other services from non-Federal sources	2,520	3,035	3,114	3,114	0
25.3	Other goods and services from Federal sources	606	606	606	606	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	710	710
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	212	212	212	212	0
31	Equipment	62	62	62	62	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	30,081	31,625	31,865	40,865	9,000
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	1	1	1	0
44	Refunds	0	0	0	0	0
99	Total obligations	39,505	42,107	42,583	52,583	10,000

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		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Regional Climate Data and Information	Pos./BA	28	42,583	28	45,583	0	3,000
	FTE/Obl.	26	42,583	26	45,583	0	3,000

Tribal Drought Resilience Initiative Increase (+$3,000, 0 FTE/ 0 Positions) – NOAA proposes an increase to broaden Tribal engagement through the National Integrated Drought Information System (NIDIS).

To effectively address this, NIDIS, along with Tribal, Federal, and other partners, jointly developed the NIDIS Tribal Drought Engagement Strategy: 2021-2025.[3] Tribal Nations will benefit from increased support to implement the strategy, which articulates specific activities and outcomes to improve: drought observations and monitoring; prediction and forecasting; communication and outreach; planning and preparedness; and interdisciplinary research. For example, increased support will allow NIDIS and our partners to rapidly build out a Tribal Drought Portal within the U.S. Drought Portal,[4] providing Tribal Nation-specific forecast and outlook data, Tribal drought learning tools, documentation of drought impacts on Tribal lands, and support for peer-to-peer Tribal drought learning networks. NIDIS will also update the processes for the U.S. Drought Monitor to ensure the information feeding the Tribal Drought Portal continues to be high-quality and useful. NIDIS will expand its Coping with Drought grant competition to enhance natural resource planning and climate mitigation in Tribal nations, enhancing economic development and jobs. A Tribal Drought Monitoring Program will install pilot stations to expand soil moisture and climate monitoring sites to significantly enhance drought prediction.

This work is authorized by the *National Integrated Drought Information System (NIDIS) Act of 2006* (P.L. 109-430).

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

[3] https://www.drought.gov/sites/default/files/2020-11/NIDIS-Tribal-Engagement-Strategy-2021-2025.pdf
[4] www.drought.gov/tribal

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Schedule and Milestones:
FY 2022
- Execute two-year Tribal Drought Resilience grant competition
- Conduct Tribal Drought Monitoring Pilot Program and Resilience Activities
- Update the NIDIS processes and local inputs for the U.S. Drought Monitor

FY 2023 - FY 2026
- Continue Tribal Drought Resilience grant efforts
- Use pilot program finds to inform a robust plan for expanding and operating soil moisture and climate monitoring sites within Tribal lands, leveraging USDA's Tribal Soil Climate Analysis Network, NOAA's Climate Reference Network, the National Mesonet Program, and other monitoring networks
- Continue support for resilience activities with Tribal partners

Deliverables:
- Conduct Missouri River Basin and Midwest DEWS Drought Monitoring Pilot Program
- Convene at least four regional Tribal Drought Forums
- Build out a Tribal Drought Portal within the US Drought Portal
- Support applied research on drought indicators and early warning on Tribal lands
- Provide technical support and training opportunities to Tribal nations with significant drought exposure

Performance Measures	2022	2023	2024	2025	2026
Number of Tribes engaged and benefitting from Tribal Drought Resilience Initiative					
With Increase	10	20	35	50	50
Without Increase	0	0	0	0	0

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(Dollar amounts in thousands)

Outyear Costs:					
Direct Obligations	3,000	3,000	3,000	3,000	3,000
Capitalized	1,000	1,000	1,000	1,000	1,000
Uncapitalized	2,000	2,000	2,000	2,000	2,000
Budget Authority	3,000	3,000	3,000	3,000	3,000
Outlays	1,860	1,860	1,860	1,860	1,860
FTE	0	0	0	0	0
Positions	0	0	0	0	0

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Climate Research
Subactivity: Regional Climate Data and Information

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	2,043	2,063	2,119	2,119	0
11.3	Other than full-time permanent	127	127	127	127	0
11.5	Other personnel compensation	11	11	11	11	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	2,181	2,201	2,257	2,257	0
12	Civilian personnel benefits	767	775	796	796	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	75	75	75	75	0
22	Transportation of things	8	8	8	8	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	270	270	270	270	0
23.2	Rental Payments to others	33	33	33	33	0
23.3	Communications, utilities and misc charges	34	34	34	34	0
24	Printing and reproduction	15	15	15	15	0
25.1	Advisory and assistance services	2,640	3,155	3,235	3,235	0
25.2	Other services from non-Federal sources	2,520	3,035	3,114	3,114	0
25.3	Other goods and services from Federal sources	606	606	606	606	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	1,000	1,000
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	212	212	212	212	0
31	Equipment	62	62	62	62	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	30,081	31,625	31,865	33,865	2,000
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	1	1	1	0
44	Refunds	0	0	0	0	0
99	Total obligations	39,505	42,107	42,583	45,583	3,000

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		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
	Pos./BA	56	64,588	70	74,588	14	10,000
Climate Competitive Research	FTE/Obl.	53	64,588	64	74,588	11	10,000

Marine Ecosystem Responses to Climate Change Increase (+$10,000, 11 FTE/ 14 Positions) – NOAA proposes an increase to provide decision-makers with the information and tools they need to prepare for changing oceans and Great Lakes, reducing climate impacts, and increasing the resilience of living marine resources (LMRs) and the communities that depend on them.

In order to provide robust projections of future ocean ecosystems needed for LMR management decisions, this increase will build a national ocean/ecosystem modeling and prediction system spanning U.S. coastal waters, the Arctic, and the Great Lakes. Investments in high performance computing (HPC) and model advances will yield ocean predictions spanning the range of ocean futures at refined resolutions required to meet NOAA's LMR mandates across seasonal to multi-decadal climate change time horizons. The increase will invest in NOAA's workforce to ensure sustained delivery of this vital information to our cross-agency partners (NMFS, NOS) and stakeholders, while maintaining external research partnerships to ensure NOAA's ocean modeling and prediction capabilities remain at the leading edge of science and technology advances. This system will be developed as part of an integrated cross-agency "Climate Fisheries Initiative" (CFI), ensuring that ocean predictions and projections are rapidly translated into actionable information, improved management decisions, and more resilient LMRs and coastal communities.

To manage commercially important and protected species, NOAA requires high quality information on changing ocean and Great Lakes conditions to make important determinations, such as when new fisheries can be opened and legacy fisheries are no longer viable. The quality of the information on changing ocean and Great Lakes conditions is impeded by fragmentation of regional ocean prediction efforts, limited computational resources, data dissemination bottlenecks, and limited understanding of the linkages between weather/climate drivers and marine resource response. NOAA is uniquely positioned to address this challenge by combining its expertise in marine resource management with new advances in modeling future ocean and Great Lakes conditions. This initiative will improve coordination and adequate delivery of regionally-appropriate climate and extreme event information for inclusion in fishery and protected species management processes. This initiative will also support the sustainability of economically and culturally valuable species that affects 1.8+ million jobs and over $200 billion in commercial and recreational fishing industries.[5]

[5] https://cpo.noaa.gov/Meet-the-Divisions/Climate-and-Societal-Interactions/The-Adaptation-Sciences-Program/Climate-Fisheries

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Research is a core capability of NOAA. This request will help NOAA meet the Administration's climate research goals, including EO 14008, and is critical to ensuring NOAA produces research data, tools, and information products that are publically accessible to facilitate climate change decision-making Nation-wide.

Schedule and Milestones:
FY 2022

- Establish capacity to accelerate development and regional application of NOAA's Modular Ocean Model v.6 ocean and biogeochemical modeling system
- Work with the NOAA CIO on HPC needs to support enhanced climate-fisheries modeling needs
- Form regional ocean modeling teams with Federal and academic partners through NOAA's Cooperative Institutes in five regions (West Coast, East Coast & Gulf of Mexico, Arctic, Pacific Islands, Great Lakes)
- Deliver 5 prototype high-resolution configurations to these five regions
- Establish capacity to accelerate development of global biogeochemical predictions to provide critical acidification, nutrient, and oxygen information for regional ocean modeling and prediction systems
- Support the implementation of competitive research grants to address climate impacts on living marine resources

FY 2023 - FY 2026

- Establish CFI information hub/data portal with comprehensive links to current Climate-Fisheries Resources (FY 2023)
- Complete multi-decadal physical-biogeochemical retrospective ocean simulations in each of the 5 regions and serve fisheries-critical fields on the CFI information hub for NMFS/NOS partners (FY 2024)
- Complete retrospective seasonal to multi-annual physical ocean forecast experiments for each of the 5 regions and serve fisheries critical fields on the CFI information hub for NMFS/NOS partners (FY 2025)
- Establish global biogeochemical prediction capacity on seasonal to multi-annual time-scales and repeat regional forecasts with biogeochemistry (FY 2026)
- Complete climate change projections for each of the 5 regions and serve fisheries-critical fields on the CFI information hub for NMFS/NOS partners (FY 2026)
- Continue competitive grant funding cycles

Deliverables:

- Strengthened academic partnerships through sustained co-development of modeling infrastructure via Cooperative Institutes
- High-resolution multi-decadal retrospective ocean/biogeochemical simulations across U.S. coastal waters and Great Lakes for understanding past LMR fluctuations (FY 2023)

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(Dollar amounts in thousands)

- High-resolution seasonal to multi-annual ocean/biogeochemical predictions across U.S. coastal waters and Great Lakes to inform tactical marine resource management decisions (FY 2024/FY 2026)
- High-resolution multi-decadal ocean/biogeochemical climate change projections across U.S. coastal waters and Great Lakes to inform management strategies aimed at resilient LMRs and coastal communities under climate change (FY 2026)
- A robust data portal to ensure high-priority fisheries and climate datasets and model output are accessible to LMR scientists and managers (FY 2023)
- A global biogeochemical prediction capacity on seasonal to multi-annual time scales to augment existing multi-decadal earth system projections (FY 2026)
- Fund research projects each year to understand and improve fisheries-critical multi-year ocean and biogeochemical prediction capabilities, and improve/innovate ocean prediction systems (FY 2022-2026)
- Conduct collaborative research projects to understand links between climate, LMRs, and coastal communities, and improve LMR management through climate-informed decisions (FY 2022-2026)

Performance Measures	2022	2023	2024	2025	2026
Comprehensive “coast-wide” ocean/biogeochemical hindcasts, predictions, and projections available on the CFI data hub (5 regions, 3 products)					
With Increase	0	0	5	7	15
Without Increase	0	0	0	0	0

Outyear Costs:					
Direct Obligations	10,000	10,000	10,000	10,000	10,000
Capitalized	3,633	3,633	3,633	3,633	3,633
Uncapitalized	6,367	6,367	6,367	6,367	6,367

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(Dollar amounts in thousands)

Budget Authority	10,000	10,000	10,000	10,000	10,000
Outlays	6,200	6,200	6,200	6,200	6,200
FTE	11	14	14	14	14
Positions	14	14	14	14	14

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Climate Research
Subactivity: Climate Competitive Research
Program Change: Marine Ecosystem Responses to Climate Change Increase

Title		Grade	Number	Annual Salary	Total Salaries
Research Physical Scientist		ZP-III	3	74,702	$224,106
Research Physical Scientist		ZP-IV	2	106,471	$212,942
Research Physical Scientist		ZP-III	1	70,821	$70,821
Research Physical Scientist		ZP-IV	1	100,940	$100,940
Research Physical Scientist		ZP-III	1	70,883	$70,883
Research Physical Scientist		ZP-IV	1	101,028	$101,028
Research Physical Scientist		ZP-III	1	70,989	$70,989
Research Physical Scientist		ZP-IV	1	101,179	$101,179
Research Physical Scientist		ZP-IV	1	98,151	$98,151
Research Physical Scientist		ZP-III	1	72,750	$72,750
Research Physical Scientist		ZP-IV	1	103,690	$103,690
Total			14		$1,227,479
Less lapse	25.00%		(3)		(306,870)
Total full-time permanent (FTE)			11		920,609
2022 Pay Adjustment (2.7%)					24,856
					945,465

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	11
Total FTE	11
Authorized Positions:	
Full-time permanent	14
Total Positions	14

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Climate Research
Subactivity: Climate Competitive Research

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	3,648	3,684	3,784	4,729	945
11.3	Other than full-time permanent	181	181	181	181	0
11.5	Other personnel compensation	53	53	53	95	42
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	3,882	3,918	4,018	5,005	987
12	Civilian personnel benefits	1,289	1,302	1,337	1,633	296
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	309	309	309	351	42
22	Transportation of things	129	129	129	129	0
23	Rent, communications, and utilitites	0	0	0	14	14
23.1	Rental payments to GSA	737	737	737	737	0
23.2	Rental Payments to others	326	326	326	326	0
23.3	Communications, utilities and misc charges	1,110	1,110	1,110	1,110	0
24	Printing and reproduction	50	50	50	120	70
25.1	Advisory and assistance services	2,513	2,513	2,513	2,527	14
25.2	Other services from non-Federal sources	5,312	6,346	6,609	9,909	3,300
25.3	Other goods and services from Federal sources	1,294	1,294	1,294	1,308	14
25.4	Operation and maintenance of facilities	0	0	0	25	25
25.5	Research and development contracts	0	0	0	140	140
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	14	14
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,252	1,252	1,252	1,392	140
31	Equipment	451	451	451	591	140
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	42,507	44,057	44,452	49,256	4,804
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	1	1	1	0
44	Refunds	0	0	0	0	0
99	Total obligations	61,162	63,795	64,588	74,588	10,000

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
	Pos./BA	56	64,588	59	73,588	3	9,000
Climate Competitive Research	FTE/Obl.	53	64,588	55	73,588	2	9,000

Providing Climate Change Projections out to 2050 to Inform Risk Management Increase (+$9,000, 2 FTE/ 3 Positions) – NOAA proposes an increase to develop standardized and accessible climate projections with society-relevant data delivery services to improve climate risk information equity and assist decision making across a wide range of stakeholders and economic sectors.

There is a critical need for improved projections of how climate will change on regional scales through the next several decades (2021 through 2050). This period covers a rich decision space for city planning, infrastructure, natural resource management, national security, and policy goals for reaching carbon neutrality. Global climate model output intended for fundamental physical science cannot—without proper interpretation and application of the data—necessarily address the needs of stakeholders to quantify regional climate risk at the spatial and temporal scales of interest for their decisions. NOAA is well positioned to take on this vital task of producing actionable climate projections and matching them with the needs for a range of societal decisions.

NOAA will build a strategic climate data delivery and communication effort with three approaches: (1) improvement of climate information equity through technology; (2) delivery of data to resource-equipped users; and (3) enhancement of engagement with stakeholders and regional constituents via existing channels. Through existing National Centers for Environmental Information (NCEI) platforms, NOAA will make improvements to climate information and expand efforts to handle large model ensemble datasets. Projections and historical data will be explored with the aid of an interface to develop end-to-end graphics and risk quantification metrics or downloaded in text files. This will allow users access to historic-to-future perspectives on climate risk. Large ensemble data will be moved to cloud-based services via the NOAA Big Data Program, likely supporting industry and academic users. Data will also be stored at NCEI to improve access without a paywall and support. NOAA will also utilize programs at the NOAA Climate Program Office and Cooperative Science Centers to support the development of Federal data products and services to meet stakeholder demands, and connect this work back to model development, connecting NOAA Service offices, research laboratories, and the external physical and social science communities. A key part of this initiative will be to create pathways at

multiple educational levels to improve accessibility for under-represented groups.

Research is a core capability of NOAA. This request will help NOAA meet the Administration's climate research goals, including EO 14008, and is critical to ensuring NOAA produces research data, tools, and information products that are publically accessible to facilitate climate change decision-making Nation-wide.

Schedule and Milestones:
FY 2022
- Develop implementation strategy
- Conduct stakeholder workshops to match needs with current modeling capabilities and projections

FY 2023 - FY 2026
- Provide increasing range of climate projections and products that leverage improvements in modeling capabilities, remain current in terms of greenhouse gas and other anthropogenic forcing scenarios, and that meet the tailored needs of stakeholders in different regions and sectors
- Establish an accessible and standardized database of climate projections that can be alongside NOAA's observed environmental data

Deliverables:
- Provide world-leading standardized information for use in decision-making and planning in response to climate change.
- Develop state-of-the-art, new capabilities in modeling and serving the needs of stakeholders
- Improve climate information equity by engaging with stakeholders in optimal ways to convey the information and data on extremes to stakeholders and decision-makers
- Train and develop the next generation of climate change scientists through its post-doctoral hires, cooperative institutes, and

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(Dollar amounts in thousands)

competitive grants to academic researchers that will be enhanced by the initiative

Performance Measures	2022	2023	2024	2025	2026
Annual number of climate projection products tailored for stakeholders					
With Increase	25	40	60	75	100
Without Increase	0	0	0	0	0

Outyear Costs:					
Direct Obligations	9,000	9,000	9,000	9,000	20,000
Capitalized	700	700	700	700	700
Uncapitalized	8,300	8,300	8,300	8,300	83,00
Budget Authority	9,000	9,000	9,000	9,000	9,000
Outlays	5,580	5,580	5,580	5,580	5,580
FTE	2	3	3	3	3
Positions	3	3	3	3	3

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PROGRAM CHANGE PERSONNEL DETAIL

Activity: Climate Research
Subactivity: Climate Competitive Research
Program Change: Providing Climate Change Projections out to 2050 to Inform Risk Management Increase

Title		Grade	Number	Annual Salary	Total Salaries
Program Analyst		ZP-III	1	72,750	$72,750
Physical Scientist		ZP-III	1	74,702	$74,702
Data Manager		ZP-III	1	64,649	$64,649
					$0
					$0
Total			3		$212,101
Less lapse	25.00%		(1)		(53,025)
Total full-time permanent (FTE)			2		159,076
2022 Pay Adjustment (2.7%)					4,295
					163,371

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	2
Total FTE	2
Authorized Positions:	
Full-time permanent	3
Total Positions	3

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Climate Research
Subactivity: Climate Competitive Research

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	3,648	3,684	3,784	3,947	163
11.3	Other than full-time permanent	181	181	181	181	0
11.5	Other personnel compensation	53	53	53	53	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	3,882	3,918	4,018	4,181	163
12	Civilian personnel benefits	1,289	1,302	1,337	1,386	49
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	309	309	309	309	0
22	Transportation of things	129	129	129	129	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	737	737	737	737	0
23.2	Rental Payments to others	326	326	326	326	0
23.3	Communications, utilities and misc charges	1,110	1,110	1,110	1,110	0
24	Printing and reproduction	50	50	50	50	0
25.1	Advisory and assistance services	2,513	2,513	2,513	2,513	0
25.2	Other services from non-Federal sources	5,312	6,346	6,609	6,609	0
25.3	Other goods and services from Federal sources	1,294	1,294	1,294	1,294	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	700	700
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,252	1,252	1,252	1,252	0
31	Equipment	451	451	451	451	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	42,507	44,057	44,452	52,540	8,088
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	1	1	1	0
44	Refunds	0	0	0	0	0
99	Total obligations	61,162	63,795	64,588	73,588	9,000

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(Dollar amounts in thousands)

		2022 Base		2022 Estimate		from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
	Pos./BA	56	64,588	57	71,588	1	7,000
Climate Competitive Research	FTE/Obl.	53	64,588	54	71,588	1	7,000

Precipitation Prediction Grand Challenge Increase (+$7,000, 1 FTE/ 1 Position) – NOAA proposes an increase to enhance the skill of precipitation predictions across weather and climate timescales in a research environment and for potential transition to operations.

Through this initiative, NOAA will improve understanding of key physical processes operating in the atmosphere and oceans, identify ways to improve model representations of these processes, and reduce the systematic biases in NOAA models, which will lead to the demonstration of improved precipitation forecast skill. This initiative will focus on key research areas, including conducting process studies, ocean and atmospheric field campaigns, and global modeling experiments targeting key model deficiencies that limit precipitation prediction skill. Research efforts will improve NOAA's predictive capability of OAR's Earth System Model and the research version of the Unified Forecast System (UFS) especially for precipitation excesses and deficiency. NOAA will also support data set development, model evaluation, and testing of data assimilation systems for advancements to better integrate observations and modeling communities to evaluate and reduce model biases and improve the precipitation skills.

This work will be done in coordination with OAR's ocean observation initiative, which will measure and monitor ocean variability and change, and is critical for predicting sources of moisture and heat that can drive regional precipitation. NOAA will engage Labs, Centers, and Cooperative Institutes across NOAA, as well as the private and academic research communities through competitive grants and in partnership with other U.S. Federal agencies in the U.S. Global Change Research Program (USGCRP) and the international research community.

Research is a core capability of NOAA. This request will help NOAA meet the Administration's climate research goals, including EO 14008, and is critical to ensuring NOAA produces research data, tools, and information products that are publically accessible to facilitate climate change decision-making Nation-wide.

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(Dollar amounts in thousands)

Schedule and Milestones:

FY 2022

- Engage NOAA Labs, Centers, Cooperative Institutes and the private and academic research communities, and partner with Federal agencies in USGCRP and the international research community, on the development of research efforts including ocean and atmospheric field campaigns and global modeling experiments
- Provide grants and other assistance to improve understanding of key physical processes operating in the atmosphere and oceans, identify ways to improve model representations of these processes, and reduce the systematic biases in NOAA models

FY 2023 - FY 2026

- Continue support for multiple-year research projects to address key processes that are needed to advance precipitation skill (FY 2022-2026)
- Work with the broad national and international community to implement multi-disciplinary, multi-agency process studies targeting key deficiencies in forecast systems that limit precipitation prediction skill (FY 2024)

Deliverables:

- Deliver research efforts to improve NOAA's predictive capability of OAR's Earth System Model and the research version of the UFS (FY 2024)
- Conduct collaborative research projects with partners and document the individual project final reports of the results, with data archived at open archives such as NCEI (FY 2025)
- Develop coherent, testable hypotheses for major precipitation systematic errors in partnership with the U.S. and international communities, and fund research projects to test these hypotheses and to explore productive algorithmic changes to address them (FY 2026)
- Support projects that synthesize existing field observations for more effective applications to prediction model development and improvement (FY 2026)

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Performance Measures	2022	2023	2024	2025	2026
Reduce the bias in U.S. seasonal precipitation simulations in OAR Earth System models by margins that are statistically significant					
With Increase	0%	1%	2%	3%	4%
Without Increase	0%	0%	0%	0%	0%
Cumulative number of research studies on key ocean/atmosphere processes that advance precipitation skill and the uptake of the results from those studies into precipitation models					
With Increase	6	11	16	21	26
Without Increase	3	5	7	9	11
Outyear Costs:					
Direct Obligations	7,000	7,000	7,000	7,000	7,000
Capitalized	500	500	500	500	500
Uncapitalized	6,500	6,500	6,500	6,500	6,500
Budget Authority	7,000	7,000	7,000	7,000	7,000
Outlays	4,340	4,340	4,340	4,340	4,340
FTE	1	1	1	1	1
Positions	1	1	1	1	1

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Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Climate Research
Subactivity: Climate Competitive Research
Program Change: Precipitation Prediction Grand Challenge Increase

Title		Grade	Number	Annual Salary	Total Salaries
Physical Scientist		ZP-III	1	70,821	$70,821
Total			1		$70,821
Less lapse	25.00%		(0)		(17,705)
Total full-time permanent (FTE)			1		53,116
2022 Pay Adjustment (2.7%)					1,434
					54,550

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	1
Total FTE	1
Authorized Positions:	
Full-time permanent	1
Total Positions	1

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Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Climate Research
Subactivity: Climate Competitive Research

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	3,648	3,684	3,784	3,839	55
11.3	Other than full-time permanent	181	181	181	181	0
11.5	Other personnel compensation	53	53	53	53	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	3,882	3,918	4,018	4,073	55
12	Civilian personnel benefits	1,289	1,302	1,337	1,354	17
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	309	309	309	309	0
22	Transportation of things	129	129	129	129	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	737	737	737	737	0
23.2	Rental Payments to others	326	326	326	326	0
23.3	Communications, utilities and misc charges	1,110	1,110	1,110	1,110	0
24	Printing and reproduction	50	50	50	50	0
25.1	Advisory and assistance services	2,513	2,513	2,513	2,513	0
25.2	Other services from non-Federal sources	5,312	6,346	6,609	6,609	0
25.3	Other goods and services from Federal sources	1,294	1,294	1,294	1,294	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	500	500
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,252	1,252	1,252	1,252	0
31	Equipment	451	451	451	451	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	42,507	44,057	44,452	50,880	6,428
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	1	1	1	0
44	Refunds	0	0	0	0	0
99	Total obligations	61,162	63,795	64,588	71,588	7,000

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
	Pos./BA	56	64,588	56	104,588	0	40,000
Climate Competitive Research	FTE/Obl.	53	64,588	53	104,588	0	40,000

Advanced Research Projects Agency for Climate Increase (+$40,000, 0 FTE/ 0 Positions) – NOAA proposes an increase to fund collaborative research in climate adaptation and resilience with the new Advanced Research Projects Agency for Climate (ARPA-C) at the Department of Energy (DOE).

The ARPA model of high-risk, accelerated research is uniquely meant to conduct research and development (R&D) that, if successful, results in transformational technology advancements. This specific initiative is in support of the larger initiative within DOE's funding request to establish and fund mission-related adaptation and resilience research projects through ARPA-C. This cross-departmental effort will also have a strong role in government-wide coordination of research in climate adaptation and resilience to ensure that the investments support solutions that benefit the broader community, national, and potentially international needs.

This NOAA initiative for ARPA-C blue carbon research will be executed as a reimbursable with DOE. NOAA will invest in research to explore such topics as the extent of blue carbon ecosystems, the factors that influence sequestration, and the management actions that are effective in enhancing sequestration. These efforts would inform how NOAA's restoration and conservation efforts help sequester carbon while also protecting marine ecosystem diversity.

Research is a core capability of NOAA. This request will help NOAA meet the Administration's climate research goals, including EO 14008, and is critical to ensuring NOAA produces research data, tools, and information products that are publically accessible to facilitate climate change decision-making Nation-wide.

Schedule and Milestones
FY 2022 - FY 2026

- Provide reimbursable funding for ARPA-C to support mission-related adaptation and resilience research projects

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Deliverables

- Conduct collaborative research in climate adaptation and resilience with DOE's ARPA-C

Performance Measures	2022	2023	2024	2025	2026
With Increase	0	0	0	0	0
Without Increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	40,000	40,000	40,000	40,000	40,000
Capitalized	40,000	40,000	40,000	40,000	40,000
Uncapitalized	0	0	0	0	0
Budget Authority	40,000	40,000	40,000	40,000	40,000
Outlays	24,800	24,800	24,800	24,800	24,800
FTE	0	0	0	0	0
Positions	0	0	0	0	0

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Climate Research
Subactivity: Climate Competitive Research

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	3,648	3,684	3,784	3,784	0
11.3	Other than full-time permanent	181	181	181	181	0
11.5	Other personnel compensation	53	53	53	53	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	3,882	3,918	4,018	4,018	0
12	Civilian personnel benefits	1,289	1,302	1,337	1,337	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	309	309	309	309	0
22	Transportation of things	129	129	129	129	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	737	737	737	737	0
23.2	Rental Payments to others	326	326	326	326	0
23.3	Communications, utilities and misc charges	1,110	1,110	1,110	1,110	0
24	Printing and reproduction	50	50	50	50	0
25.1	Advisory and assistance services	2,513	2,513	2,513	2,513	0
25.2	Other services from non-Federal sources	5,312	6,346	6,609	6,609	0
25.3	Other goods and services from Federal sources	1,294	1,294	1,294	41,294	40,000
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,252	1,252	1,252	1,252	0
31	Equipment	451	451	451	451	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	42,507	44,057	44,452	44,452	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	1	1	1	0
44	Refunds	0	0	0	0	0
99	Total obligations	61,162	63,795	64,588	104,588	40,000

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JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Weather and Air Chemistry Research

Goal Statement

Weather & Air Chemistry Research continually improves capabilities to provide more accurate and timely warnings and forecasts of various high-impact weather, water, and air quality events by prioritizing improvements in weather data observation, modeling, computing, forecasting, and warnings for the protection of life and property, for the enhancement of the national economy and in support of the Department of Commerce 2018-2022 Strategic Plan, Strategic Objective 3.3 Reduce Extreme Weather Impacts.

Base Program

OAR's weather research laboratories, programs, and partners are key contributors to advancing the National Weather Service (NWS) prediction capabilities. NOAA also focuses resources on better understanding and providing information on seasonal (3 months to 2 years) and sub-seasonal (2 weeks to 3 months) outlooks for farmers, fishermen, emergency responders, other industry workers, and the American people regarding what to expect in two weeks, next month, or next season. In addition, scientists working within OAR's Weather & Air Chemistry Research study atmospheric chemistry to accurately characterize atmospheric composition and predict meteorological processes to more effectively understand their role in severe weather.

The following two Subactivities are included in Weather & Air Chemistry Research:

- Laboratories & Cooperative Institutes: OAR's Laboratories & Cooperative Institutes primarily support weather forecasting improvement and air chemistry research, modeling, and technology development.
- Weather & Air Quality Research Programs: Primarily encourages cooperation with external experts in weather and air chemistry research by improving predictions and warnings for the public and weather sensitive U.S. industries with cutting-edge research, analysis techniques, and observing platforms.

NOAA's weather research activities are authorized under the *Weather Service Modernization Act* (Title VII, 15 U.S.C. § 313 note, §§ 701-709), the *National Oceanic and Atmospheric Administration Authorization Act* (Title I, § 108, 15 U.S.C. § 313 note), the *Weather Research and Forecasting Innovation Act* (15 U.S.C. § 8501), and the *National Integrated Drought Information System (NIDIS) Reauthorization Act* (P.L. 115-423; 15 U.S.C. § 8511-8521).

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Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Statement of Operating Objectives

Schedule and Milestones:
FY 2022 - FY 2026
Laboratories & Cooperative Institutes

- High-quality hurricane observations from airborne experiments for use in hurricane regional model data assimilation and evaluation

Weather & Air Quality Research Programs

- Advance radar capabilities to better estimate precipitation in the cool season using dual polarization techniques in operational radar's Multi Radar Multi Sensor
- Complete annual competitive grant process to select USWRP-funded and demonstration projects
- Evaluate Advanced Technology Demonstrator as a proof-of-concept for phased array radar
- Review industry proposals for phased array radar pre-production contract award, provided that NOAA accepts phased array radar as its solution for its future radar system
- Test/evaluation of dual-polarization panel characteristics and performance on phased array radar systems including the ATD
- Improved tornado warning decision performance evaluated and quantified in collaboration with NWS forecasters within the Hazardous Weather Testbed

Deliverables:
Laboratories & Cooperative Institutes

- Tsunami observation, mitigation, and forecast tools
- Probabilistic products incorporated into flash flood forecasting system
- A total of 100,000 stations feeding observations data to the Meteorological Assimilation Data Ingest System
- Improved skill and reliability of flood and water supply forecasts

Weather & Air Quality Research Programs

- Prototype phased array radar products available for transfer into NOAA operations

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Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Explanation and Justification

Line Item		FY 2020 Actual		FY 2021 Enacted		2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Laboratories & Cooperative Institutes (Weather & Air Chemistry Research)	Pos/BA	230	82,287	282	84,980	282	87,145
	FTE/OBL	207	83,646	274	84,980	274	87,145
U.S. Weather Research Program	Pos/BA	14	22,955	10	26,425	10	26,688
	FTE/OBL	8	21,362	10	26,425	10	26,688
Tornado Severe Storm Research/Phased Array Radar	Pos/BA	3	13,586	3	14,336	3	14,466
	FTE/OBL	3	11,885	3	14,336	3	14,466
Joint Technology Transfer Initiative	Pos/BA	2	14,980	5	12,950	5	13,080
	FTE/OBL	4	16,461	5	12,950	5	13,080
Total Weather & Air Chemistry Research	Pos/BA	249	133,808	300	138,691	300	141,379
	FTE/OBL	222	133,354	292	138,691	292	141,379

Overall, OAR's Weather Research supports:

- Research and development that provides the Nation with accurate and timely warnings and forecasts of high-impact weather events and their broader impact on issues of societal concern such as weather and air chemistry; and
- Research that provides the scientific basis for informed management decisions about weather, water, and air chemistry.

NOAA's Global Ensemble Forecast System (GEFS) underwent significant upgrades to expand its capabilities and improve weather forecasting. NOAA uses the GEFS to produce medium-range weather forecasts and to issue watches and warnings during high-impact weather events, including hurricanes, blizzards, and extreme heat and cold. With the upgrade, the National Weather Service can deliver its first-ever numerical weather predictions three and four weeks in advance, extending the forecast length from 16 to 35 days and providing more lead time for decision making. GEFS now uses the Finite-Volume Cubed-Sphere (FV3) dynamical core,

which was added to the Global Forecast System (GFS) model in 2019. GEFS resolution increased from approximately 33km to 25km, and the number of individual forecasts input into the ensemble has increased from 21 to 31. The changes will allow models to run at a higher resolution of detail and provide better accuracy. The atmospheric composition model in the GEFS upgrade that integrates weather and aerosol forecasting based on the FV3 framework is the result of more than five years of model development at NOAA.

The 2020 Atlantic hurricane season was record-breaking with 30 named. The season included 13 hurricanes of which six were "major" with top winds of 74 miles per hour or greater. NOAA's extensive observations collected during the 2020 Hurricane season provided landmark datasets for the evaluation of ocean models and hurricane forecast improvements, further progressing NOAA's ability to protect American life and property throughout each hurricane season. NOAA and partner scientists deployed uncrewed ocean gliders equipped with sensors to measure temperature and salinity down to a half mile below the ocean surface in summer 2020, an effort that NOAA and partners have undertaken each hurricane season since 2014. During the 2020 hurricane season, NOAA and partner gliders (including NOAA-sponsored universities and Navy) collected 163,000 data profiles of ocean conditions - a 63 percent increase in information gathered compared to the 2019 hurricane season.

OAR's Weather Research Portfolio is collaborative and crosscutting and therefore is often funded through multiple Subactivities. Some cross-cutting themes include:

Tornado Severe Storm Research / Phased Array Radar
OAR is working to couple weather forecast model information with dual-polarized radar observations to better determine the type and intensity of precipitation, and add the ability to classify hail size and detect tornado debris. Other radar research includes developing phased array radar, which can reduce the time to, providing earlier weather predictions.
Forecaster and Researcher Collaboration
Researchers and forecasters work side-by-side throughout the year in the NOAA Hazardous Weather Testbed (HWT) to develop, test, and evaluate new forecast and warning strategies. Participants explore innovative radar and satellite technologies, decision support systems, and new weather and water prediction models. Each year, the HWT draws as many as 60 researchers and forecasters together for six to eight weeks to review emerging ideas and answer the question, "What do forecasters need?" HWT scientists also test new concepts and tools with forecasters in simulated settings and with real-time forecasts. This collaborative

approach promotes effective transfer of research into forecasting and warning operations.

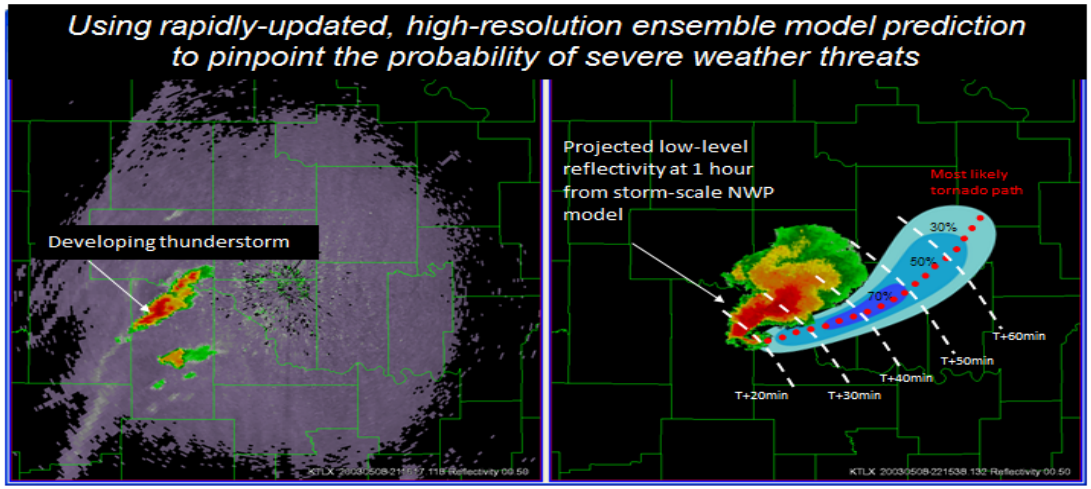
Earlier Warnings

Currently, NWS does not issue warnings for local severe weather until they see an early signal on radar, or the weather hazard is spotted. This approach provides the public with an average tornado warning lead time of 9 minutes. However, hospitals, nursing homes, large venue operators, aviation officials, and others require 30 minutes of lead time or more to move citizens to safety. Through its Warn-On-Forecast project, OAR is working to combine high-resolution surface satellite and radar data into a set of analyses allowing computer models to predict specific weather hazards 30-60 minutes before they form. This would enable decision-makers to take more effective action to mitigate damage and reduce injuries and loss of life.

Each spring, during prime time for severe thunderstorms and tornadoes, the NOAA Hazardous Weather Testbed hosts experiments that bring together researchers, forecasters and academics to test new technologies. Forecasters and researchers get to walk in each other's shoes.

U.S. Weather Research Program

Through a competitive grant program, the U.S. Weather Research Program provides continuous improvements to understand, predict, and communicate information associated with hazardous weather, air quality and seasonal to sub-seasonal events. Results of this research are transferred to NWS after demonstration in several NOAA testbeds. Projects are selected using a peer-review process with NWS participation.



Earth Prediction Innovation Center

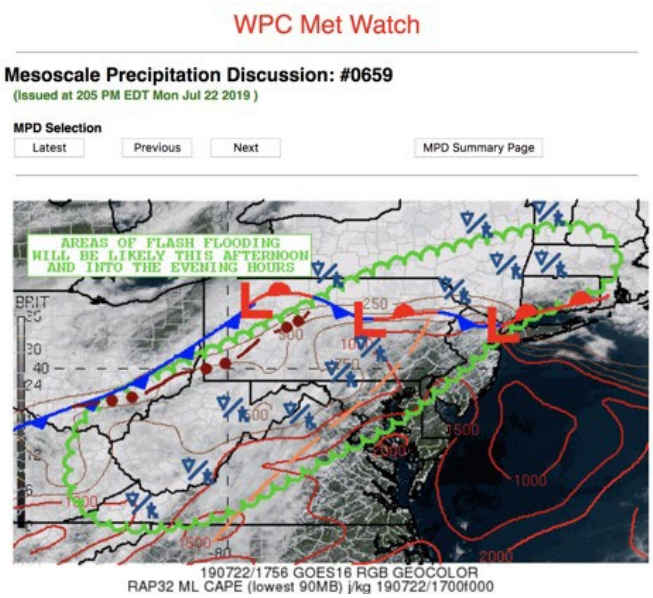
The *National Integrated Drought Information System Reauthorization Act of 2018* expands Section 102(b) of the Weather Research and Forecasting Innovation Act of 2017 to include the Earth Prediction Innovation Center (EPIC) for advancing weather modeling skill and international leadership in the area of numerical weather prediction, and directs NOAA's U.S. Weather Research Program to carry out the activities of EPIC. The Act directs NOAA to create a true community global weather research modeling system that is accessible by the public and utilizes innovative strategies to host and manage the modeling system. EPIC leverages existing NOAA resources to accelerate advances to the Unified Forecast System (UFS), a community-based, coupled comprehensive Earth system model-based analysis and prediction system designed to meet NOAA's operational forecast mission to protect life and property and improve economic growth.

VORTEX-USA

The *Weather Research and Forecasting Innovation Act of 2017* (Public Law 115-25) authorized the implementation of a tornado warning improvement and extension program, codified in the Consolidated Appropriations Act, 2021, as VORTEX-USA. The National Severe Storms Laboratory (NSSL) and the Weather Program Office are collaborating to build the program with the aim of reducing the loss of life and economic damage caused by tornadoes, including expanding atmospheric observations, advancing radar technology, and improving the delivery of actionable weather information. VORTEX-USA continues the work of the VORTEX-SE program, closely coordinating with this broader initiative.

Improved Flood & Drought Predictions

Accurate rain and snowfall predictions help water and emergency managers to better balance water supply needs. Partnering with NWS and other Federal, state, and local water resource agencies, OAR researches the extreme precipitation and weather conditions that can lead to droughts or flooding by evaluating new observations and modeling tools to improve these forecasts. Floods and flash floods kill more people each year than any other severe weather hazard. And a few extra minutes of notice can make a big difference in reducing deaths and economic loss. This is why NOAA is testing an experimental flash flood and intense rainfall forecasting tool. The Warn-on-Forecast System,[6] or WoFS, provides high-resolution information and can update quickly. The current operational model focuses on individual thunderstorms and hazards associated with those storms a few hours before they form and as they develop. Ultimately, the new tool will help forecasters issue flash flood warnings earlier.



A Warn-on-Forecast product showing conditions for flash flooding over the I-95 corridor.

The prediction system proved its usefulness in July 2019 when parts of the Northeast and mid-Atlantic were inundated with intense rainfall. The storms resulted in flooded roads during rush hour, stranded motorists, cancelled and delayed flights, power outages and property damage. Forecasters used WoFS as they observed the perfect conditions for flash flooding over the I-95 corridor, and

[6] https://www.nssl.noaa.gov/projects/wof/

the experimental system showed up to five inches of rain in some areas. The guidance provided through WoFS gave forecasters more confidence to use the phrase “flash flooding likely” when they issued area forecasts for parts of Pennsylvania and New Jersey, down to Baltimore, Washington D.C and Virginia.

Air Chemistry

Whether it is fine particulate matter, or other airborne substances, air pollution can have significant impact on the environment and human health. OAR Weather Research & Air Chemistry provides a strong scientific understanding of these air chemistry problems to help all stakeholders make effective management decisions. With long-term monitoring of chemicals like mercury, nitrogen and other compounds, OAR provides data to identify sources and evaluate the effectiveness of emission controls.

Data from these observations, along with model evaluations and other studies, help improve predictions of where airborne substances come from and where they will go. NWS uses OAR-developed air chemistry models to issue air quality warnings so that people can limit their exposure to air pollution. OAR’s atmospheric dispersion models also predict impacts during emergencies, like the 2019 Texas chemical plant explosion and fire.

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(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
U.S. Weather Research Program	Pos./BA	10	26,688	18	33,688	8	7,000
	FTE/Obl.	10	26,688	16	33,688	6	7,000

Fire Weather Increase (+$7,000, 6 FTE/ 8 Positions) – NOAA proposes an increase to develop a collaborative and integrated fire weather research program to enable new research into the coupled modeling for both the short-term fire-atmosphere and sub-seasonal to climate scale modeling systems. A new NOAA Fire Weather Testbed will be established that will bring together OAR, NWS, NESDIS, and emergency managers from across the fire weather community to develop new impact-based decision support tools, products, and models.

The increase in the frequency of drought and hot-dry-windy conditions over the last several decades, combined with the continued expansion into the wildland-urban interface region, has led to a marked increase in the number of acres burned by hazardous wildfire. The number of wildfires and the acres burned are projected to increase as the climate warms, with profound changes to certain ecosystems. Wildfires threaten forest and grasslands, housing and communities, aquatic and soil ecosystems, and air quality both near to and far from the fires, and ultimately costs the Nation billions of dollars a year when accounting for the local costs of damage to buildings, communities, and the downstream impacts on human health associated with smoke and poor air quality.

OAR will partner with NESDIS to improve the use of current satellite observations and develop new tools that expand the use of these unique observations. Multi-faceted field campaigns will be conducted using advanced observational tools to characterize the physical and chemical processes that must be represented by our modeling systems and to provide powerful verification datasets that would be used to evaluate these improved models. OAR will work with NWS and emergency managers from across the fire weather community to develop new impact-based decision support tools, which will improve the ability to provide timely and accurate guidance to safeguard lives and property and manage downstream air quality impacts.

Research is a core capability of NOAA. This request will help NOAA meet the Administration's climate research goals, including EO 14008, and is critical to ensuring NOAA produces research data, tools, and information products that are publicly accessible to facilitate climate change decision-making Nation-wide.

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Schedule and Milestones:
FY 2022

- Improve understanding of the sources and magnitude of uncertainty in wildfire plume forecasting that will help prioritize future research and development aimed at reducing uncertainties
- Develop recommendations for fire behavior forecast algorithms that would be suitable for implementation into operational models
- Establish new physics parameterizations to simulate the effects of fire heat and moisture flux on meteorology in weather and air quality models
- Generate a new model grid and configuration to simulate the fire-weather interactions including pyroCbs
- Complete at least one high-resolution meteorological, fire weather and smoke simulation over the western U.S. using the August-September 2020 fire dataset
- Improve understanding of the impacts from fire heat flux and model physics configurations on operational weather forecasting that could be applied to the Unified Forecast System regional convective-allowing model
- Validate machine learning modules that could be applied to Week 3-4 forecast models
- Develop machine learning-based forecasting frameworks to explore fire-weather forecasts at Weeks 3 & 4 and to explore seasonal outlooks for summer and fall fire weather potential
- Begin development of an algorithm suitable for research-to-operations transition of fire-weather forecasts at Weeks 3 & 4 to the Climate Prediction Center
- Plan and design an observational prototype Weather-Air Quality Trailer for timely deployment to areas of the country with environmental conditions that are conducive to wildfire development and for rapid deployment in areas where wildfires are occurring/developing across the U.S.

FY 2023 - FY 2026

- Continue development of a wildfire forecasting ensemble that could be used operationally to predict smoke plume transport and dispersion with quantified uncertainty estimation
- Begin development of an algorithm suitable for research-to-operations transition of seasonal outlooks for summer and fall fire weather potential to Climate Prediction Center and the National Interagency Coordination Center Predictive Services
- Extend algorithm developed for Week-2 out to Weeks 3 and 4
- Develop an experimental seasonal fire forecast product that may be transitioned to operational predictive services and can be used as antecedent conditions for fire weather behavior modeling and forecasting
- Refine and build multiple mobile Weather and Air Quality Trailers to be deployed across wildfire zones that would provide an observational data-set for verification and improvement of the wildfire forecasting system(s)

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Deliverables:
FY 2022 - FY 2026

- Complete a plan for the Fire Weather Testbed
- Conduct five interagency tests and evaluations through the NOAA Fire Weather Testbed
- Prepare six new fire weather products for delivery to operational platforms
- Complete nine new fire weather modeling improvements
- Implement fire behavior forecast algorithms into the NWS's National Air Quality Forecast Capability, HRRR-Smoke, Rapid Refresh Forecast System, and/or the above wildfire forecasting ensemble
- Publish four journal articles summarizing the scientific advancements in fire weather applications
- Complete a plan for the Weather and Air Quality Trailer data processing, instrument calibration, and data visualization

Performance Measures	2022	2023	2024	2025	2026
Cumulative number of NOAA Fire Weather Model improvements ready for transition into NWS operations					
With Increase	0	1	3	6	9
Without Increase	0	0	0	1	2

Outyear Costs:					
Direct Obligations	7,000	7,000	7,000	7,000	7,000
Capitalized	705	705	705	705	705
Uncapitalized	6,295	6,295	6,295	6,295	6,295
Budget Authority	7,000	7,000	7,000	7,000	7,000
Outlays	4,340	4,340	4,340	4,340	4,340

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

FTE	6	8	8	8	8
Positions	8	8	8	8	8

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Weather Research
Subactivity: U.S. Weather Research Program
Program Change: Fire Weather Increase

Title		Grade	Number	Annual Salary	Total Salaries
Program Manager		ZP-V	1	140,428	$140,428
Physical Scientist		ZP-IV	6	101,028	$606,168
Physical Scientist		ZP-IV	1	103,690	$103,690
Total			8		$850,286
Less lapse	25.00%		(2)		(212,572)
Total full-time permanent (FTE)			6		637,715
2022 Pay Adjustment (2.7%)					17,218
					654,933

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	6
Total FTE	6
Authorized Positions:	
Full-time permanent	8
Total Positions	8

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National Oceanic and Atmospheric Administration
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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Weather Research
Subactivity: U.S. Weather Research Program

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	564	570	585	1,240	655
11.3	Other than full-time permanent	20	20	20	20	0
11.5	Other personnel compensation	1	1	1	1	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	585	591	606	1,261	655
12	Civilian personnel benefits	195	197	202	399	197
13	Benefits for former personnel	3	3	3	3	0
21	Travel and transportation of persons	78	78	78	78	0
22	Transportation of things	1	1	1	1	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	102	102	102	102	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	5	5	5	5	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	4,546	6,568	6,665	6,665	0
25.2	Other services from non-Federal sources	686	686	686	686	0
25.3	Other goods and services from Federal sources	931	931	931	931	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	309	309	309	309	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	705	705
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	662	662	662	662	0
31	Equipment	316	316	316	316	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	12,941	15,974	16,120	21,563	5,443
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	2	2	2	2	0
44	Refunds	0	0	0	0	0
99	Total obligations	21,362	26,425	26,688	33,688	7,000

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Tornado/Severe Storm	Pos./BA	3	14,466	3	16,966	0	2,500
Research	FTE/Obl.	3	14,466	3	16,966	0	2,500

Phased Array Radar Increase (+$2,500, 0 FTE/ 0 Positions) – NOAA proposes an increase to advance and refine the conceptual design of the rotating planar array for the phased array radar in support of NWS operational requirements.

A key objective identified in the Weather Radar Follow-On Plan[7] was to develop a prototype system to provide observational capabilities consistent with NWS operational requirements. The increase would be used to refine the conceptual design of the rotating planar array that has emerged in recent years as the leading candidate for a phased array radar that meets or exceeds NWS operational requirements. These activities would culminate in a plan for a prototype system to be developed with the capabilities required to complete NOAA's Weather Radar Follow-On Plan research and development (R&D) to meet the established timeline for the eventual replacement of NOAA's current Weather Surveillance Radar 88 Doppler (WSR-88D).

Research is a core capability of NOAA. This request will help NOAA meet the Administration's climate research goals, including EO 14008, and is critical to ensuring NOAA produces research data, tools, and information products that are publically accessible to facilitate climate change decision-making Nation-wide.

Schedule and Milestones:
FY 2022
- Provide necessary funding to refine the conceptual design of the rotating planar array concept

FY 2023 - FY 2026
- Support prototype system planning to meet the established timeline for the eventual replacement of the WSR-88D

Deliverables:
- Develop a prototype system to provide observational capabilities consistent with NWS operational requirements

[7] https://www.nssl.noaa.gov/publications/mpar_reports/RadarFollowOnPlan_ReporttoCongress_2020June_Final.pdf

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

- Develop a plan for a prototype system to be developed with the capabilities required to complete NOAA's Weather Radar Follow-On Plan R&D

Performance Measures	2022	2023	2024	2025	2026
new Cumulative number of new weather radar design proposals developed using advanced phased array radar technologies and concepts for potential use as a replacement for the WSR-88D					
With Increase	0	0	1	1	2
Without Increase	0	0	0	0	0

Outyear Costs:					
Direct Obligations	2,500	2,500	2,500	2,500	2,500
Capitalized	1,500	1,500	1,500	1,500	1,500
Uncapitalized	500	500	500	500	500
Budget Authority	2,500	2,500	2,500	2,500	20,000
Outlays	1,550	1,550	1,550	1,550	1,550
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Weather Research
Subactivity: Tornado/Severe Storm Research

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	346	349	359	359	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	3	3	3	3	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	349	352	362	362	0
12	Civilian personnel benefits	250	253	259	259	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	18	18	18	18	0
22	Transportation of things	39	39	39	39	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	270	270	270	270	0
23.3	Communications, utilities and misc charges	9	9	9	9	0
24	Printing and reproduction	1	1	1	1	0
25.1	Advisory and assistance services	11	11	11	11	0
25.2	Other services from non-Federal sources	1,597	1,597	1,597	2,097	500
25.3	Other goods and services from Federal sources	44	44	44	44	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	3,951	4,929	4,975	5,975	1,000
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	205	205	205	205	0
31	Equipment	386	386	386	386	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	4,755	6,222	6,290	7,290	1,000
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	11,885	14,336	14,466	16,966	2,500

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JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Ocean, Coastal, and Great Lakes Research

Goal Statement

The Ocean, Coastal, and Great Lakes Research in OAR provides science to coastal communities from a wide network of university partners, develops technology to advance the Nation's oceans and Great Lakes observations, and coordinates multi-partner ocean exploration missions to characterize our natural resources and improve our understanding of the changes occurring in the oceans and Great Lakes.

Base Program

OAR's ocean, coastal, and Great Lakes laboratories, programs, and partners have been key contributors to advancing NOAA's NMFS, NOS, and NWS by providing research to better understand our oceans and Great Lakes natural resources and the influence of the oceans and Great Lakes on the Earth's weather and climate through technological advancements in modeling, computing, observing, and information dissemination.

The following six Subactivities are included in the Ocean, Coastal, and Great Lakes Research portfolio:

- Laboratories & Cooperative Institutes: Primarily supports foundational ocean observation networks and research, modeling, and technology development at OAR's laboratories and cooperative institutes.
- National Sea Grant College Program: Established by Congress through the National Sea Grant College Program Act, the National Sea Grant Collage Program is a Federal-state partnership that turns research into actions that support science-based sustainable practices. This partnership ensures that coastal communities remain engines of economic growth. The Sea Grant programs form a dynamic national network of more than 300 participating institutions represented by more than 2,300 scientists, engineers and outreach experts based at universities across the country.
- Ocean Exploration and Research: Established by Congress through the Ocean Exploration Act, Ocean Exploration and Research is the only Federal organization dedicated to ocean exploration.
- Integrated Ocean Acidification (OA) authorized under the Federal Ocean Acidification Research and Monitoring Act to better understand ocean acidification and the consequences of OA on marine resources to enable communities to mitigate, prepare, and adapt to changes.

- Sustained Ocean Observations and Monitoring: A global system for observations, modelling, and analysis of marine and ocean variables to support operational ocean services worldwide.
- National Oceanographic Partnership Program (NOPP): This OAR funding line was established in FY 2019 to advance ocean science research through the program established under 10 U.S.C. 7901 and to continue support for Ocean Joint Technology Transfer Initiative projects funded in fiscal year 2018.

Statement of Operating Objectives

Schedule and Milestones:
FY 2022 - FY 2026
Laboratories & Cooperative Institutes
- Continue collection and analysis of acoustic data from Ocean Noise Reference Stations, in coordination with NMFS and NOS
- Demonstrate/test new ocean observing/communication technologies

National Sea Grant College Program
- Hold local and regional state program requests for proposals
- Continue to ensure accountability to NOAA aligned program plans through external Performance Review Panels

Ocean Exploration and Research
- Develop an annual extramural competition for conducting the next phase of research into the potential resources and natural habitats in areas identified through the ECS Mapping Initiative
- Develop an annual extramural competition for the exploration of unknown and poorly known ocean areas where there is a high potential for discovery

Integrated Ocean Acidification
- Conduct OA coastal observing and process research cruises and deploy OA sensors on NOAA research and volunteer observing ships
- Develop a coastal early-warning system that can identify episodic low pH events and alert managers of potentially impacted resources
- Partner with IOOS Marine Sensor Program to develop marine sensors that can assist coastal industries with both scientific and monitoring capacity
- Optimize observing systems in each of the eight large marine ecosystem regions

- Increase number of living marine resources characterized for vulnerability to ocean acidification

Sustained Ocean Observations and Monitoring
- Maintain NOAA's contribution of 1500 active Argo ocean profiling floats and implement Deep (6000 meters) Argo array
- Maintain Global Ocean Observing System (GOOS)

National Oceanographic Partnership Program (NOPP)
- Projects focused on improving NOAA's operational efficiency and resource management responsibilities, including activities designed to support the blue economy

Deliverables:
Laboratories & Cooperative Institutes
- Technical Report to describe current and chemical distributions in coastal waters in relation to known point sources, to assess relative strengths of land-based sources of pollution over southeast Florida reef tracks
- Pre-operational forecast products to alert the over two million coastal Lake Erie residents of algal toxins in drinking water
- An annual, synthetic, ecosystem-based assessment of the eastern Bering Sea for the North Pacific Fisheries Management Council

National Sea Grant College Program
- Continue to leverage state and other partners
- Assist coastal communities to adopt sustainable development principles
- Create and transfer decision-support tools/technologies to coastal managers
- Support Sea Grant activities to restore degraded ecosystems
- Provide coastal resource managers with information/training in local hazard resiliency, and hazard mitigation tools, techniques, and best practices

Ocean Exploration and Research
- Complete Bureau of Ocean Energy Management-NOAA Partnership expedition to explore and characterize habitats and ecosystems in the Arctic and other key areas within the U.S. Exclusive Economic Zone (EEZ)
- Increased number of telepresence-enabled systematic expeditions providing opportunities to engage a multitude of shore-based stakeholders and other users in real-time ocean exploration

Integrated Ocean Acidification

- Regional biogeochemical and ecological models

Sustained Ocean Observations and Monitoring

- 1,000 drifting buoys deployed annually
- 250 Argo Array Buoys deployed annually

National Oceanographic Partnership Program (NOPP)

- Transition research into operational applications

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Explanation and Justification

Line Item		2020 Actuals		2021 Enacted		2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Laboratories & Cooperative Institutes (Ocean, Coastal and Great Lakes Research)	Pos/BA	108	35,309	134	36,098	131	36,708
	FTE/OBL	105	35,779	131	36,098	128	36,708
National Sea Grant College Program	Pos/BA	22	86,825	24	87,950	24	88,768
	FTE/OBL	15	86,148	23	87,950	23	88,768
Ocean Exploration and Research	Pos/BA	30	41,600	40	42,639	39	43,049
	FTE/OBL	26	42,047	37	42,639	36	43,049
Integrated Ocean Acidification	Pos/BA	13	13,959	14	15,404	14	15,602
	FTE/OBL	13	13,985	14	15,404	14	15,602
Sustained Ocean Observations and Monitoring	Pos/BA	36	44,895	31	45,063	30	45,449
	FTE/OBL	33	43,954	29	45,063	28	45,449
National Oceanographic Partnership Program	Pos/BA	1	4,995	1	2,994	1	3,023
	FTE/OBL	1	4,594	1	2,994	1	3,023
Total Ocean, Coastal, and Great Lakes Research	Pos/BA	210	227,583	244	230,148	239	232,599
	FTE/OBL	193	226,507	235	230,148	230	232,599

Overall, OAR's Ocean, Coastal, and Great Lakes Research supports:

- Improving understanding of the physics, chemistry, and ecology of oceanic, coastal, and Great Lakes systems, including changes in these environments and the impacts of stressors such as changes in temperature, changes in ocean and Great Lakes chemistry, pollution, and invasive species;
- Improving predictive capability for oceanic, coastal, and Great Lakes processes, including developing predictive models for ecosystems, and coupling these with physical and biogeochemical models to create comprehensive Earth System Models;
- Translating ocean, coastal, and Great Lakes science into services through tools developed for resource managers, policy makers and the public, and through increased education and outreach; and
- Developing and using cutting edge technology for understanding and exploring the ocean, coasts and Great Lakes.

In 2020, NOAA's Harmful Algal Bloom daily forecasts got a boost from a new model, developed by scientists at NOAA's Great Lakes Environmental Research Lab (GLERL), which allows scientists to better understand and predict the size of the bloom. Forecasters can use the new model to predict how extensively the bloom has spread from the lake's surface to its floor. HABs can be a thin scum on the lake surface or they can mix evenly throughout the water column. Previous HAB forecast models relied heavily on satellite imagery, but those images can only show how concentrated the algal bloom is on the surface of the lake. Knowing how the blooms are vertically distributed throughout the lake's depths improves the accuracy and usefulness of the forecasts. Anglers, boaters, and beach goers use the improved forecast prior to an excursion to Lake Erie. Drinking water plants along Lake Erie are alerted when to expect algal blooms near their water intakes which allows facility managers to better regulate the amount of chemical treatment to use, saving taxpayer money.

As part of New Jersey Sea Grant Consortium's project, New Jersey oyster farmer Tommy Burke of Sloop Point Oysters assists New Jersey Division of Fish and Wildlife staff with loading his oysters on a boat for planting at a restoration site. Credit: Lisa Calvo | New Jersey Sea Grant Consortium

Much of the research performed within OAR's Ocean, Coastal, & Great Lakes Research is collaborative and crosscutting and therefore is often funded through multiple Sub-activities. Some cross-cutting themes include:

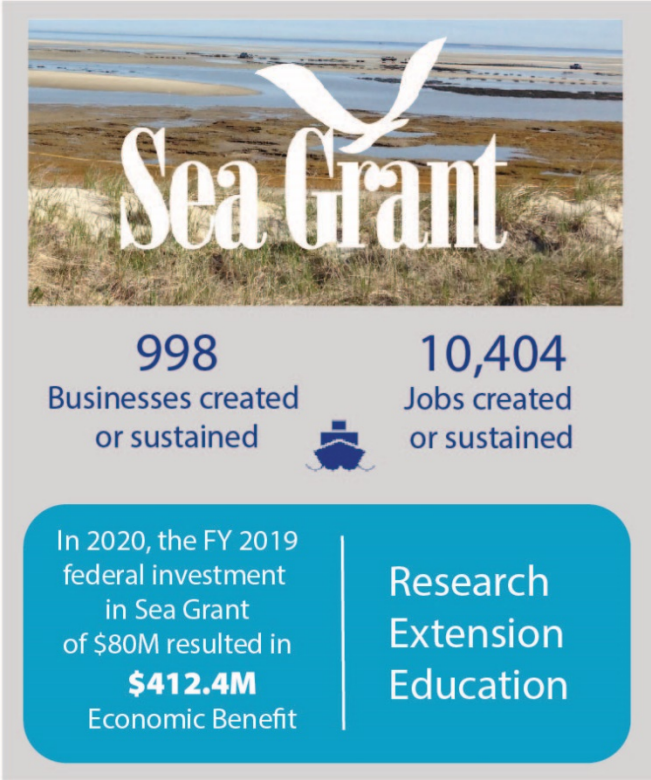
Ecosystems Research

OAR Laboratories and Cooperative Institutes conduct research on ecological processes, and provide data to develop models critical to understanding ecosystem structure and function in important and economically significant environments in the oceans and the Great Lakes, including coral reefs, deep sea hydrothermal vents, and fish and shellfish habitat. Through observations, laboratory, and field experiments researchers also develop models to forecast impacts of multiple stressors, such as invasive species and nutrient runoff, on water quality, food webs, and fishery productivity. This work supports the development of new models, forecasting tools, and applications to evaluate and mitigate impacts to present and future ecosystem stressors.

Photo shows a Harmful Algal Bloom (HAB) developing in Lake Erie. The NOAA Great Lakes HAB and Hypoxia program is a collaborative effort between GLERL and Cooperative Institute scientists. The team uses an integrated approach to understand the ecosystem dynamics and environmental drivers of HABs and hypoxia in the Great Lakes to improve prediction and mitigation strategies.

Integrated Marine and Ocean Processes

OAR carries out interdisciplinary scientific investigations of the physics of ocean currents and water properties, and on the role of the ocean in extreme weather events, and ecosystems. The tools used to carry out these studies range from sensors on deep ocean moorings to satellite-based instruments to measurements made on research and commercial shipping vessels and autonomous vehicles, and include data analysis and numerical modeling. NOAA scientists and partners conduct innovative research and develop numerical models to predict the physical, chemical, biological, and ecological response in the oceans and Great Lakes due to weather, climate, and human-induced changes. The forecast models and quantitative tools developed by researchers allow scientists, coastal resource managers, policy makers, and the public to make informed decisions for optimal management of oceans and Great Lakes resources. The ocean, coasts, and Great Lakes are closely tied to the Earth's atmosphere, and a sound understanding of ocean-earth interactions is essential for better management of marine resources and improved ocean and weather services.



Resilient Communities and Economies

OAR's Ocean, Coastal and Great Lakes Research works through the National Sea Grant College Program to develop vibrant and resilient coastal economies that use comprehensive planning to make informed strategic decisions; improve coastal water resources that sustain human health and ecosystem services; and adapt to the impacts of coastal hazards.

Sustainable Fisheries and Aquaculture

The National Sea Grant Marine Aquaculture Grant Program is the only U.S. government grant program dedicated to supporting marine aquaculture development. OAR's marine aquaculture work ensures safe, secure and sustainable supplies of domestic seafood and decreases reliance on seafood imports through aquaculture research, extension, and grants. As a part of the cross-NOAA Program, OAR works with aquaculture partners in the NMFS and the (NOS) in coordination with state fisheries managers, seafood processors, fishing associations and consumer groups. These grants tackle some of the top challenges to marine aquaculture like reducing fishmeal and fish oil in aquaculture feeds, increasing seafood safety and quality, diversifying species and products. OAR's aquaculture competition is authorized under the National Aquaculture Act of 1980.

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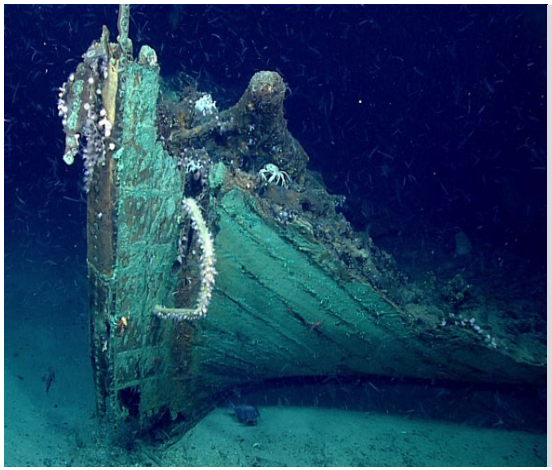
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

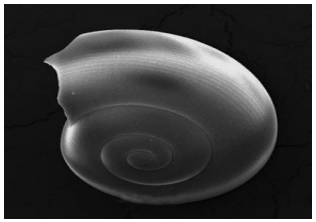
Ocean Exploration
OAR leads efforts to explore and characterize deep-water areas of the U.S. Exclusive Economic Zone, Extended Continental Shelf, and other poorly known ocean areas and phenomena. Since its commissioning in 2008, the *Okeanos Explorer*, NOAA's ship assigned to exploration, has mapped over a million square kilometers of the seafloor at high resolution. Data collected from ocean exploration expeditions have been critical for science-based decisions on issues like deepwater fisheries management, potential oil and gas development or deep-sea mining, marine protected area establishment and management, determination of the U.S. Extended Continental Shelf, and nautical charting.

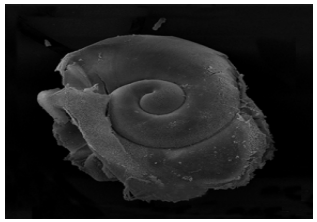


In May 2019 on a NOAA Ship *Okeanos Explorer* expedition along the edge of the Florida Escarpment in the Gulf of Mexico, a shipwreck was discovered during a remotely operated vehicle (ROV) dive. The discovery took place during the final hours of the expedition's last engineering dive, as ROV pilots trained a junior engineer on the use of the manipulator arm. Searching for rocks to sample, the pilots were following a series of waypoints when their sonar detected an obstacle that appeared to be a shipwreck. The find was confirmed as they approached, and the onboard team was able to convene a group of marine archaeologists and maritime experts for an impromptu telepresence discussion. The ship's command and mission team agreed to extend the dive for three hours longer than planned, enabling a more thorough characterization of the wreck, including collection of imagery for a complete photomosaic.

Ocean Chemistry and Ocean Acidification
Research across OAR labs, programs, and Cooperative Institutes aims to improve our understanding of how, and how fast, ocean chemistry is changing, how variable that change is by region, and what impacts these changes are having on marine life, people, and the local, regional, and national economies. OA refers to changes in the chemistry of the ocean due to rising atmospheric carbon dioxide; currently, ocean chemistry is changing faster than any period in the past 55 million years. OAR's Ocean Acidification

Program (OAP) maintains long-term OA monitoring, conducts research to enhance the conservation of marine ecosystems sensitive to OA, and promotes OA educational opportunities. By better understanding and predicting OA, OAP also informs national and international carbon mitigation discussions and enables local communities to better prepare, mitigate, and adapt to changes caused by OA.





Impacts to a pteropod's shell in seawater that is too acidic (images above). The left panel shows a shell collected from a live pteropod from a region in the Southern Ocean where acidity is low. The shell on the right is from a pteropod collected in a region where the water is more acidic. Photo credits: (left) Bednaršek et al. 2012; (right) Nina Bednaršek.

Sustained Ocean Observations and Monitoring (SOOM)
SOOM supports NOAA's contribution to the sustained Global Ocean Observing System (GOOS) by maintaining over 3,950 platforms that report environmental weather/climate information to global prediction centers and researchers. GOOS is a permanent global system for observations, modelling, and analysis of marine and ocean variables to support operational ocean services worldwide. The U.S. Integrated Ocean Observing System (IOOS) is the U.S. regional contribution to GOOS and SOOM activities contribute unique and essential global measurements and capabilities to the IOOS enterprise. SOOM's contribution helps describe the present state of the oceans, monitors long-term changes, supports operational services worldwide and is the basis for forecasting climate variability and change. SOOM also supports research to develop new data products from these observations to address a broad range of stakeholder needs.

National Oceanographic Partnership Program (NOPP)
The NOPP was established by Public Law 104-201 to "coordinate and strengthen national oceanographic efforts by identifying and carrying out partnerships among Federal agencies, academia, industry, and other members of the oceanographic scientific community in the areas of data, resources, education, and communication." With an increasing amount of research and development spending occurring within the private sector relative to the federal government, NOPP is a unique catalyst for participation by non-

governmental organizations and industry in federal ocean research and education projects. NOAA has been investing ad hoc resources (on an annual basis) toward this effort.

Previous NOPP successes include creation of a comprehensive national ocean observing network, air/ocean modeling improvements and transitions, and innovative marine technology solutions. Future efforts under discussion include:

- Reducing plastic waste in the oceans
- Comprehensive mapping and characterization of the U.S. Exclusive Economic Zone
- Development of next-generation autonomous and remote (air and satellite) marine data collection systems
- New discoveries of ocean resources and marine habitat dynamics that are gleaned from existing marine information databases.
- Seamless national oceanographic and marine information systems that provide transparent access and advanced data management and analysis tools

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Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
National Sea Grant College	Pos./BA	20	75,644	22	110,644	2	35,000
Program	FTE/Obl.	19	75,644	20	110,644	1	35,000

Sea Grant Builds Resilient Coasts: Expanding Local and Regional Coastal Resilience Capacity and Community Assistance (+$35,000, 1 FTE/ 2 Positions) – NOAA proposes an increase to expand Sea Grant's research and engagement, in coordination with partners, to make coastal communities more resilient to natural hazards and changing conditions. Examples of this work include understanding local risks and needs; filling critical information gaps through cutting edge research and data collection with communities; expanding the use of decision-making tools; developing and implementing solutions with stakeholders, including underserved communities; and essential partnership coordination and information sharing. This proposal complements the increase requested for Sea Grant for research and workforce development supporting underserved communities.

Demands for locally relevant information and technical assistance present opportunities to provide critical information to communities that improve their economic and environmental resilience. Sea Grant works closely with long-standing, embedded, and trusted networks. These networks harness the depth, reach, and voices of university, state, and local expertise, including traditional knowledge. With this funding, Sea Grant will expand co-production of innovative, timely, and localized science and solutions, leveraging NOAA's resilience science, tools, and technical assistance. This research and engagement work will include vulnerability assessments; integration of information about future conditions (e.g., climate change, population shifts, land use change); resilience planning and implementation; nature-based solutions; local capability building; and support for tribal, indigenous, and economically disadvantaged communities.

Sea Grant proposes the following activities: 1) Local and Regional Resilience Research and Extension Capacity Building; Sea Grant will expand its approach of placing research, extension, and education professionals in the communities they serve and provide university-based research funding allowing programs to be nimble and responsive to emerging and local needs; 2) National Coastal Resilience Research; Sea Grant will also build on its foundation of investments in coastal resilience through one or more national Federal funding opportunities (considering joint competitions with other NOAA funding/programs); and 3) Enhanced National Collaboration Capacity; in order to strengthen and expand local and regional science and engagement effectiveness and reach across the U.S., Sea Grant will invest in state and headquarters-based national coordination capacity. These efforts will support key collaboration with partners across NOAA, the national landscape, and the Sea Grant network.

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(Dollar amounts in thousands)

There is an increasing need for NOAA to create and foster natural and economic resilience along our coasts through support, expertise and robust, on-the-ground partnerships and place-based conservation activities. Ecological restoration and community resilience, as outlined in EO 14008, are integral to NOAA and the Administration's climate strategy.

Schedule and Milestones:
FY 2022 - FY 2023
- Expand capacity building through additional research, education, extension state Sea Grant staff, as well as national resilience coordination
- Support state Sea Grant programs' research, training, technical assistance, and coordination to address community resilience needs at the local, state, and regional levels, including underserved communities
- Invest in national coordination capacity to further support collaboration with partners across NOAA and the national landscape, and across the Sea Grant network

FY 2023 - FY 2026
- Expand core programs and work with partners to assist communities to strike a more sustainable path toward resilience
- Build on the long-standing investments in these embedded and trusted university and partner resources further increasing Federal relevance, applicability, and impact at the local and regional level

Deliverables:
- Additional extension, communication, and/or education staff in state Sea Grant programs to increase engagement and integration of locally-based, applied research, education, and technical assistance to better meet increasing coastal community needs
- State Sea Grant programs' and partners' critical research, training, technical assistance, and coordination advancing informed decision-making and resilience outcomes at the local and regional levels, including underserved communities
- Increased national coordination capacity and expanded Federal Partnership Liaison program, significantly enhancing synergies and leveraging resources and information sharing across the Sea Grant network, NOAA, and external partners

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of communities that adopt/implement hazard resiliency practices to prepare for and respond to minimize coastal hazardous events					
With Increase	225	250	350	400	500
Without Increase	200	200	200	200	200
Outyear Costs:					
Direct Obligations	35,000	35,000	35,000	35,000	35,000
Capitalized	400	400	400	400	400
Uncapitalized	34,600	34,600	34,600	34,600	34,600
Budget Authority	35,000	35,000	35,000	35,000	35,000
Outlays	21,700	21,700	21,700	21,700	21,700
FTE	1	2	2	2	2
Positions	2	2	2	2	2

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Ocean, Coastal, & Great Lakes Research
Subactivity: National Sea Grant College Program
Program Change: Sea Grant Builds Resilient Coasts: Expanding Local and Regional Coastal Resilience Capacity and Community Assistance

Title		Grade	Number	Annual Salary	Total Salaries
National Resilience Coordinator		ZA-III	2	72,750	$145,500
Total			2		$145,500
Less lapse	25.00%		(1)		(36,375)
Total full-time permanent (FTE)			1		109,125
2022 Pay Adjustment (2.7%)					2,946
					112,071

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	1
Total FTE	1
Authorized Positions:	
Full-time permanent	2
Total Positions	2

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Ocean, Coastal, & Great Lakes Research
Subactivity: National Sea Grant College Program

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	1,237	1,249	1,283	1,395	112
11.3	Other than full-time permanent	66	66	66	66	0
11.5	Other personnel compensation	34	34	34	34	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	1,337	1,349	1,383	1,495	112
12	Civilian personnel benefits	407	411	422	456	34
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	298	298	298	348	50
22	Transportation of things	3	3	3	3	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	252	252	252	252	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	1	1	1	1	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	7	7	7	7	0
25.2	Other services from non-Federal sources	1,397	2,053	2,313	2,713	400
25.3	Other goods and services from Federal sources	383	383	383	383	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	15	15	15	15	0
31	Equipment	7	7	7	7	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	69,186	70,171	70,560	104,964	34,404
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	73,293	74,950	75,644	110,644	35,000

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
National Sea Grant College	Pos./BA	20	75,644	20	80,644	0	5,000
Program	FTE/Obl.	19	75,644	19	80,644	0	5,000

Sea Grant's Service Equity: Assessing and Integrating Diversity, Equity, and Inclusion Actions to Support Underserved Communities (+$5,000, 0 FTE/ 0 Positions) – NOAA proposes an increase to work with partners to advance the following innovative initiatives to further connect to, learn with, and empower underserved communities. This proposal complements the increase requested for Sea Grant to expand research and engagement to make coastal communities more resilient to natural hazards and changing conditions. This proposal also includes activities such as the critical need to expand extension agents and other staff and services supporting underserved communities.

Working under a unifying "Many Seas, One Ocean" framework, Sea Grant will develop an integrative research program that will include: 1) innovative, transdisciplinary research projects led by collaborations among Minority Serving Institutions (MSI), Sea Grant programs, and other partners to ensure equity is an integral component of decision making on coastal issues affecting vulnerable and underserved residents, 2) workforce development opportunities for students of color and other underrepresented students in research-driven, community-based Science, Technology, Engineering, Arts, and Mathematics projects, and 3) faculty exchanges among Sea Grant universities and partnering MSIs to advance personal and professional relationships across institutions. Sea Grant will foster formal and informal mentoring at diverse levels, from students at the high school to college transition to established professionals, to ensure the success of the individuals and partnerships created through this program.

Sea Grant has existing infrastructure in NOAA and programs on the coasts to carry out these efforts swiftly and ensure that their impacts are sustained. These investments will build on the strong foundation of Sea Grant's over 50 years of trusted, science-driven community engagement. Sea Grant is taking essential actions in collaboration with communities and partners around the country to make ocean, coastal, and Great Lakes science, engagement, and service delivery more equitable and inclusive.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

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(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022
- Launch a national research competition, which will solicit innovative, transdisciplinary research projects from integrated MSI/Sea Grant-led teams

FY 2023 – FY 2026
- Continue to support research and workforce development that addresses the needs of underserved populations and integrates their traditional/local knowledge to address coastal issues impacting the Nation

Deliverables:
- National research funding supporting innovative, transdisciplinary, and collaborative projects led by MSI/Sea Grant-based teams
- Expanded internship and mentorship opportunities for high school, college, and/or graduate students of color and other underrepresented students, providing rigorous community-based, science-driven experiences and hands-on job training in NOAA mission-specific skills, further preparing them to join the NOAA workforce or work in NOAA adjacent disciplines

Performance Measures	2022	2023	2024	2025	2026
Number of Sea Grant tools, products, and information services that are used to advance environmental literacy and workforce development services for underserved communities					
With Increase	10	15	25	30	30
Without Increase	5	5	5	5	5

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Outyear Costs:					
Direct Obligations	5,000	5,000	5,000	5,000	5,000
Capitalized	0	0	0	0	0
Uncapitalized	5,000	5,000	5,000	5,000	5,000
Budget Authority	5,000	5,000	5,000	5,000	5,000
Outlays	3,100	3,100	3,100	3,100	3,100
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Ocean, Coastal, & Great Lakes Research
Subactivity: National Sea Grant College Program

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	1,237	1,249	1,283	1,283	0
11.3	Other than full-time permanent	66	66	66	66	0
11.5	Other personnel compensation	34	34	34	34	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	1,337	1,349	1,383	1,383	0
12	Civilian personnel benefits	407	411	422	422	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	298	298	298	338	40
22	Transportation of things	3	3	3	3	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	252	252	252	252	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	1	1	1	1	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	7	7	7	7	0
25.2	Other services from non-Federal sources	1,397	2,053	2,313	2,513	200
25.3	Other goods and services from Federal sources	383	383	383	383	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	15	15	15	15	0
31	Equipment	7	7	7	7	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	69,186	70,171	70,560	75,320	4,760
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	73,293	74,950	75,644	80,644	5,000

Department of Commerce
National Oceanic and Atmospheric Administration
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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Sustained Ocean	Pos./BA	30	45,449	33	68,449	3	23,000
Observations and Monitoring	FTE/Obl.	28	45,449	30	68,449	2	23,000

Advancing Global Ocean Observing System Increase (+$23,000, 2 FTE/ 3 Positions) – NOAA proposes an increase to address a number of stakeholder-driven requirements including: fill priority gaps for additional global ocean observations, promote innovative tools and approaches for measuring, and disseminate ocean data.

These investments will focus on four areas that will advance NOAA's understanding and prediction capability for: 1) Climate and Weather Prediction, 2) Ecosystems, 3) Decision Support for Coastal Communities, and 4) Extreme Weather & Climate Events. In each of these focus areas, this proposal will address strategic needs for better observations and knowledge products, increase the uptake of ocean information in NOAA's models that lead to improved forecasts, and utilize new technologies to develop an efficient and effective observing enterprise.

NOAA will invest in new deployments of ocean observing technology, such as Argo floats and buoys. New Argo floats will expand coverage in priority areas such the tropical Pacific, North Atlantic, Gulf of Mexico, and off southern California. NOAA will deploy buoys and other observing technology for Arctic ice and Harmful Algal Bloom information and increase spatial coverage of ocean carbon observations from ships and buoys. New projects will be supported to improve modeling and prediction capabilities in multiple areas such as the tropical Pacific and Arctic. A pilot study will be initiated to examine air-sea interactions for extreme events. NOAA will also increase data delivery of global ocean observations to diverse end users.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022

- Assess the impact of the proposed observing system redesign through real-time ocean reanalysis comparisons (FY 2022-2023)

- Conduct initial product development of maps of 5 ocean carbon and health parameters for the California Current region (FY 2022)
- Perform impact assessment of ocean observing technologies and observing system design for improving operational hurricane intensity forecasts (FY 2022- 2024)

FY 2023 - FY 2026

- Deploy 12 Argo floats to increase coverage and fill observing gaps in the region (FY 2023)
- Initiate new autonomous vehicle pilot studies (FY 2023- 2026)
- Initiate development of Tropical Pacific observing system simulation experiment capabilities to optimally integrate additional observations (FY 2023)
- Conduct initial product development of maps of 5 ocean carbon and health parameters for the Gulf of Mexico (FY 2023)
- Pilot research study to advance understanding of the rapid intensification of extratropical storms (FY 2023)
- Increase the spatial coverage of ocean carbon observations from ships and buoys to better understand variability in the ocean uptake of atmospheric CO2 (FY 2022- 2026)
- Improve data systems, including cloud-based services, for global ocean observations (FY 2023- 2024)
- Co-develop 4-8 new research projects with local and Indigenous communities to improve understanding of Arctic climate variability (FY 2022- 2026)

Deliverables:

- Begin initial implementation of redesign of the Tropical Pacific Observing System to enhance observations for better understanding and predicting the El Niño Southern Oscillation
- Increase understanding of ocean biological and chemical (i.e. carbon and oxygen) changes to inform ecological forecasting
- Increase spatial resolution of ocean carbon, biogeochemical, and sea ice observations to better understand and quantify biological, chemical (i.e. ocean carbon and oxygen), and other ocean changes to inform ecological forecasts and assessments
- Develop assessments of targeted hurricane ocean observations, and improve delivery of ocean data and products to forecasters
- Provide 180 annual new ocean profiles with at least five biological and chemical parameters (oxygen, nitrate, pH, chlorophyll, backscatter) for the California Current region and Gulf of Mexico
- Ensure real-time transmission of ocean-based observational data via high-speed Iridium systems
- Conduct new Arctic observations and research targeting improvement of NOAA's forecasts of sea ice

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Improvement in ocean model forecasts (measured by the difference between what is forecasted versus observed) as a result of enhanced observations in the tropical Pacific					
With Increase	0%	3%	5%	8%	15%
Without Increase	0%	0%	3%	4%	5%
Completion of Argo ocean carbon and ocean health observation systems in the Gulf of Mexico and the California Current Region (note that after FY? 2025: systems must be replaced to maintain 100% requirement)					
With Increase	25%	50%	75%	100%	100%
Without Increase	25%	25%	20%	12%	0%
Cumulative number of new information products and services for ocean and sea- ice forecasts that address regional and community needs					
With Increase	5	6	7	7	9
Without Increase	1	1	1	2	2

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Outyear Costs:					
Direct Obligations	23,000	23,000	23,000	23,000	23,000
Capitalized	2,000	2,000	2,000	2,000	2,000
Uncapitalized	21,000	21,000	21,000	21,000	21,000
Budget Authority	23,000	23,000	23,000	23,000	23,000
Outlays	14,260	14,260	14,260	14,260	14,260
FTE	2	3	3	3	3
Positions	3	3	3	3	3

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Ocean, Coastal, & Great Lakes Research
Subactivity: Sustained Ocean Observations and Monitoring
Program Change: Advancing Global Ocean Observing System Increase

Title		Grade	Number	Annual Salary	Total Salaries
Physical Scientist		ZP-IV	1	103,690	$103,690
Physical Scientist		ZP-III	1	72,750	$72,750
Physical Scientist		ZP-III	1	68,864	$68,864
Total			3		$245,304
Less lapse	25.00%		(1)		(61,326)
Total full-time permanent (FTE)			2		183,978
2022 Pay Adjustment (2.7%)					4,967
					188,945

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	2
Total FTE	2
Authorized Positions:	
Full-time permanent	3
Total Positions	3

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Ocean, Coastal, & Great Lakes Research
Subactivity: Sustained Ocean Observations and Monitoring

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	3,131	3,162	3,248	3,437	189
11.3	Other than full-time permanent	48	48	48	48	0
11.5	Other personnel compensation	65	65	65	65	0
11.7	Military personnel compensation	64	130	0	0	0
11.9	Total personnel compensation	3,308	3,405	3,361	3,550	189
12	Civilian personnel benefits	1,075	1,086	1,115	1,172	57
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	138	138	138	138	0
22	Transportation of things	273	273	273	273	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	80	80	80	80	0
23.2	Rental Payments to others	1	1	1	1	0
23.3	Communications, utilities and misc charges	245	245	245	2,245	2,000
24	Printing and reproduction	6	6	6	6	0
25.1	Advisory and assistance services	1,145	1,145	1,145	1,145	0
25.2	Other services from non-Federal sources	1,683	2,083	2,244	4,244	2,000
25.3	Other goods and services from Federal sources	177	177	177	177	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	552	552	552	2,552	2,000
31	Equipment	737	737	737	737	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	34,533	35,134	35,374	52,128	16,754
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	1	1	1	0
44	Refunds	0	0	0	0	0
99	Total obligations	43,954	45,063	45,449	68,448	23,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM DECREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Sustained Ocean	Pos./BA	30	45,449	30	43,449	0	(2,000)
Observations and Monitoring	FTE/Obl.	28	45,449	28	43,449	0	(2,000)

Sustained Ocean Observations and Monitoring Decrease (-$2,000, 0 FTE/ 0 Positions) – NOAA proposes a decrease in funding for Sustained Ocean Observations and Monitoring. NOAA will reduce external grant funding used to leverage partnerships to develop a sustained, comprehensive, and responsive global ocean observing system. This reduction will reduce the number of platforms NOAA and its partners can help maintain. The high-quality, long-term observations serve as a foundation for the information our nation needs to foster a more informed and climate resilient society and to reduce risks for its people, businesses, and assets. This decrease is taken in conjunction with the Advancing Global Ocean Observing System increase request and allows NOAA to continue to address a number of stakeholder-driven requirements including to fill priority gaps for additional global ocean observations, promote innovative tools and approaches for measuring, and disseminate ocean data.

Schedule and Milestones:
FY 2021 – FY 2025
- Maintain support for highest priority activities within available research funding

Deliverables:
- Decrease funding for research grants

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM DECREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Reduced error in Global Measurement of Sea Surface Temperature. (Degrees Celsius (ºC)) to improve understanding of the environment					
With Decrease	0.4	0.4	0.4	0.4	0.4
Without Decrease	0.5	0.5	0.5	0.5	0.5
Outyear Costs:					
Direct Obligations	-2,000	-2,000	-2,000	-2,000	-2,000
Capitalized	0	0	0	0	0
Uncapitalized	-2,000	-2,000	-2,000	-2,000	-2,000
Budget Authority	-2,000	-2,000	-2,000	-2,000	-2,000
Outlays	-1,240	-1,240	-1,240	-1,240	-1,240
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Ocean, Coastal, & Great Lakes Research
Subactivity: Sustained Ocean Observations and Monitoring

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	3,131	3,162	3,248	3,248	0
11.3	Other than full-time permanent	48	48	48	48	0
11.5	Other personnel compensation	65	65	65	65	0
11.8	Special personnel services payments	64	130	0	0	0
11.9	Total personnel compensation	3,308	3,405	3,361	3,361	0
12	Civilian personnel benefits	1,075	1,086	1,115	1,115	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	138	138	138	138	0
22	Transportation of things	273	273	273	273	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	80	80	80	80	0
23.2	Rental Payments to others	1	1	1	1	0
23.3	Communications, utilities and misc charges	245	245	245	245	0
24	Printing and reproduction	6	6	6	6	0
25.1	Advisory and assistance services	1,145	1,145	1,145	1,145	0
25.2	Other services from non-Federal sources	1,683	2,083	2,244	2,244	0
25.3	Other goods and services from Federal sources	177	177	177	177	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	552	552	552	552	0
31	Equipment	737	737	737	737	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	34,533	35,134	35,374	33,374	(2,000)
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	1	1	1	0
44	Refunds	0	0	0	0	0
99	Total obligations	43,954	45,063	45,449	43,449	(2,000)

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Innovative Research & Technology

Goal Statement

The Innovative Research and Technology accelerates the adoption and transition of advanced computing and technology throughout NOAA. Innovative Research and Technology supports High Performance Computing (HPC) initiatives through major improvements in weather and climate forecasting, ecosystem and ocean modeling, environmental information dissemination and in support of the Department of Commerce 2018-2022 Strategic Plan, Strategic Objective 3.3 Reduce: Extreme Weather Impacts.

Base Program

Innovative Research and Technology efforts provide NOAA with necessary computational and network resources required to support continued advances in environmental modeling capabilities. The purpose of the High Performance Computing and Communications program is to improve the accuracy and timeliness of NOAA's short-term weather warnings, seasonal forecasts, hurricane forecast improvements, as well as regional and global climate and weather predictions that are heavily dependent on major advances. Timely and responsive dissemination of NOAA's services and information requires full use of modern network and communication technologies.

The following Subactivity is included in Innovative Research & Technology:

- High Performance Computing and Communications: Supports the computing requirements for NOAA’s modeling and research missions.

Statement of Operating Objectives

Schedule and Milestones:
FY 2022 - FY 2026

- Complete migration of at least one operational model and one research model to next-generation architecture software structure
- Test impact of assimilation of new and proposed satellite observations using observing system simulation experiment and observing system experiment approaches using the operational Hurricane Weather Research and Forecast hybrid data assimilation system to improve hurricane intensity guidance

- Quantitative evaluation of (a) (statistically) downscaled climate projections for the U.S. and (b) their suitability for use in climate impacts and decision-making applications published in the peer-reviewed literature
- Participate in the Networking and information Technology Research and Development Program interagency activities

Deliverables:

- HPC System availability – 97 percent of computational hours made available to scientists
- 11 HPC and advanced networking R&D projects

Explanation and Justification

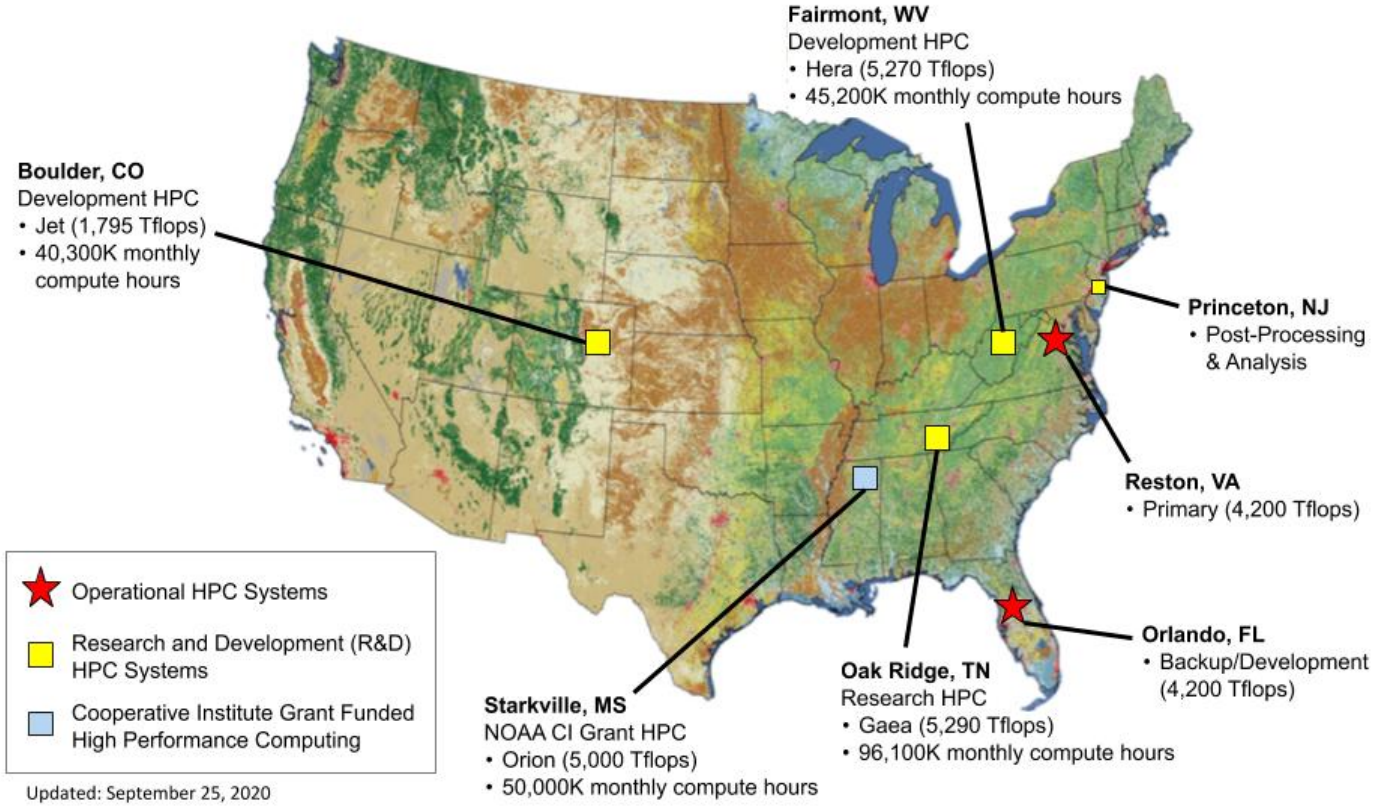
Line Item		2020 Actual		2021 Enacted		2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
High Performance Computing & Communications	Pos/BA	12	16,706	17	17,800	17	18,027
	FTE/OBL	12	17,049	16	17,800	16	18,027
Uncrewed Systems	Pos/BA	0	0	0	0	0	4,000
	FTE/OBL	0	0	0	0	0	4,000
Total, Innovative Research & Technology	Pos/BA	12	16,706	17	17,800	17	22,027
	FTE/OBL	12	17,049	16	17,800	16	22,027

High Performance Computing & Communications

HPC Initiatives, established through the *High-Performance Computing Act of 1991* (P.L. 102-194), improve the accuracy and timeliness of NOAA's short-term weather warnings, forecasts, hurricane forecast improvements, as well as regional and global climate and ecosystem predictions. HPC Initiatives provide necessary computational and network resources required to advance in environmental modeling capabilities across NOAA. In fact, every NOAA line office uses R&D HPC systems. Benefits of HPC Initiatives include:

- Improvements in short-term warning and weather forecast systems and models,

- Enabling scientists to attack long-lead time problems associated with the physical processes that govern the behavior of the atmosphere and ocean,
- Maintaining NOAA's leadership position in understanding climate with applications towards critical issues such as hurricanes, drought, sea-level rise, and
- Accelerating modeling and simulation activities and providing relevant decision support information on a timely basis for programs.



Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
	Pos./BA	0	0	4	4,000	4	4,000
Uncrewed Systems	FTE/Obl.	0	0	3	4,000	3	4,000

Uncrewed Systems Increase (+$4,000, 3 FTE/ 4 Positions) - NOAA proposes an increase to advance research and evaluation for operational readiness of a full spectrum of NOAA (aircraft and maritime) Uncrewed Systems (UxS) mission concepts.

The use of uncrewed aircraft and maritime systems have significant potential to improve the quality and timeliness of NOAA science, products, and services while reducing costs. Robust research and development (R&D) is critical for the successful transition of promising initial concepts to operational readiness. UxS technologies are not and will not become broadly ready for operational use within NOAA without dedicated, long term funding for R&D, and achieving the potential offered by UxS requires sustained R&D support.

These funds will move notional ideas to testable technologies and finalize mature, transition ready projects into operational use within NOAA. NOAA will use these resources for directed research and proposal solicitations for R&D related to UxS concepts and technologies to support missions across NOAA's Line Offices. Research will be solicited and supported via both internal NOAA competitions and external Federal funding opportunities available to academic and Federal partners. The resources will further support efforts for completing transition-to-operation activities including preparations for acceptance by receiving offices. The UxS Research Transition Office (USRTO) will provide NOAA with targeted logistical and technical support for the complicated final step of transitioning UxS technologies into operational use across the organization. The USRTO will provide the leadership to continue to identify and develop the technologies that NOAA needs to ensure we are prepared to take advantage of the potential offered by UxS.

Research is a core capability of NOAA. This request will help NOAA meet the Administration’s climate research goals, including EO 14008, and is critical to ensuring NOAA produces research data, tools, and information products that are publically accessible to facilitate climate change decision-making Nation-wide.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022
- Provide dedicated R&D support evaluating and advancing the operational readiness of a full spectrum of NOAA UxS mission concepts encompassing both aircraft and maritime systems

FY 2023 - FY 2026
- Shepherd UxS R&D activities through their transition to operation including preparation for acceptance by receiving offices
- Continued R&D to support new and ongoing projects to advance operational readiness of UxS within NOAA

Deliverables:
- Conduct directed research and proposal solicitations for R&D related to promising new UxS concepts and technologies across all NOAA Line Offices
- Increase staffing capacity to effectively manage the R&D and transition activities

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of UxS mission concepts (both aircraft and maritime systems) transitioning to operations or applications					
With Increase	2	3	3	4	5
Without Increase	0	0	0	0	0
Number of new NOAA observational systems and mission concepts utilizing UxS					
With Increase	10	15	15	20	25
Without Increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	4,000	4,000	4,000	4,000	4,000
Capitalized	1,035	1,035	1,035	1,035	1,035
Uncapitalized	2,965	2,965	2,965	2,965	2,965
Budget Authority	4,000	4,000	4,000	4,000	4,000
Outlays	2,480	2,480	2,480	2,480	2,480
FTE	3	4	4	4	4
Positions	4	4	4	4	4

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Innovative Research and Technology
Subactivity: Uncrewed Systems
Program Change: Uncrewed Systems Increase

Title		Grade	Number	Annual Salary	Total Salaries
Supervisory Physical Scientist (Director)		ZP-5	1	144,128	$144,128
Mgmt. and Prg. Analyst		ZA-4	1	103,690	$103,690
Financial Mgmt. Analyst		ZA-4	1	103,690	$103,690
Admin. Prg. Specialist		ZA-2	1	49,157	$49,157
Total			4		$400,665
Less lapse	25.00%		(1)		(100,166)
Total full-time permanent (FTE)			3		300,499
2022 Pay Adjustment (2.7%)					8,113
					308,612

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	3
Total FTE	3
Authorized Positions:	
Full-time permanent	4
Total Positions	4

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Innovative Research and Technology
Subactivity: Uncrewed Systems

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	0	0	0	309	309
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	0	0	0	309	309
12	Civilian personnel benefits	0	0	0	93	93
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	18	18
22	Transportation of things	0	0	0	0	0
23	Rent, communications, and utilitites	0	0	0	20	20
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	18	18
23.3	Communications, utilities and misc charges	0	0	0	2	2
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	0	0	0	500	500
25.3	Other goods and services from Federal sources	0	0	0	35	35
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	500	500
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	0	0	0	12	12
31	Equipment	0	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	0	0	2,493	2,493
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	0	0	0	4,000	4,000

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Systems Acquisition

Goal Statement

Research Supercomputing:
Research Supercomputing provides sustained capability to the NOAA Research and Development (R&D) High Performance Computing System (HPC) to advance Earth system science and accelerate the development of regional and sub-regional information products and services as described in the NOAA High Performance Computing Strategic Plan 2015-2020[8] and in support of the Department of Commerce 2018-2022 Strategic Plan, Strategic Objective 3.3 Reduce Extreme Weather Impacts.

Base Program

NOAA's R&D HPC provides computational resources to support advances in environmental modeling crucial for understanding critical Earth system modeling issues. NOAA's environmental modeling enterprise underpins most of NOAA's products and services to the Nation. NOAA's R&D HPC assets are part of the critical infrastructure required for NOAA to accomplish its mission. NOAA's R&D HPC support the NOAA user base in the geospatial and ecosystems research communities across the Agency. However, demand for HPC compute resources outweighs the supply currently. Based on an analysis carried out in 2016, demand for HPC compute resources outweighs the current supply of NOAA's capabilities by 32X. NOAA is exploring ways of mitigating this shortfall through other means such as cloud computing. NOAA currently has several pilots examining if cloud could be a possible solution to fill the supply and demand gap.

Statement of Operating Objectives

Schedule and Milestones and Deliverables:
FY 2022 - FY 2026

- High-resolution Earth System Model integrations publicly available for use in regional decision-making through federated data services
- Exploratory application of Earth System Models and subsequent demonstration of Earth System modeling applications using exascale high-performance computing platforms, which would be capable of at least one exaflop, or a thousand petaflops
- High-resolution integrations for prediction of seasonal tornado risks at multi-month lead times

[8] http://www.cio.noaa.gov/it_plans/HPCStrategy_Final_Draft_080913.pdf

- Improved credibility of projections of changes of important climatic quantities, such as regional climate change and extreme events, to allow society to efficiently plan for and adapt to climate change
- Capability to develop and provide decadal prototype forecasts and predictions made with high-resolution coupled climate model
- NOAA's environmental modeling applications able to utilize performance increases available through fine-grain architectures

Explanation and Justification

Line Item		2020 Actual		2021 Enacted		2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Research	Pos/BA	0	41,931	1	43,500	1	43,500
Supercomputing/CCRI	FTE/OBL	1	42,132	1	43,500	1	43,500

NOAA's R&D HPC provides computational resources to support advances in environmental modeling crucial for understanding critical Earth system modeling issues. This investment includes the supercomputing systems, associated storage devices, advanced data communications, hardware and software engineering services, security, and necessary data center space. NOAA currently operates three R&D HPCs:

- Gaea – Located at Oak Ridge National Laboratory in Oak Ridge, Tennessee, Gaea is primarily used for long-term climate and weather predictions and projections.
- Hera – Located in Fairmont, West Virginia, HERA more than doubles the previous Theia system with a total capacity of 2.7 petaflops. It supports development of weather modeling across OAR and NWS to improve the prediction of high-impact weather events and evaluate potential future directions for models and data assimilation.
- Jet – Located in Boulder, Colorado, Jet is primarily used for hurricane research.

NOAA's R&D HPC also provides software engineering support and associated tools to re-architect NOAA's applications to run efficiently on next generation fine-grain HPC architectures. Through a focused effort, engineers investigate and test new algorithms, train existing NOAA developers with new coding techniques, and assist these developers in accelerating the re-architecting of

NOAA's applications. These software engineering efforts allow NOAA to take advantage of next-generation research computing technologies, but also help NOAA to more efficiently use its existing high performance computing assets.

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
	Pos./BA	1	43,500	1	53,500	0	10,000
Research Supercomputing	FTE/Obl.	1	43,500	1	53,500	0	10,000

R&D HPC Required to Meet Major NOAA Science Outcomes Increase (+$10,000, 0 FTE/ 0 Positions) – NOAA proposes an increase to maintain and improve upon the current research and development (R&D) high performance computing (HPC) capabilities.

To address impacts of weather and climate on society while also reducing the cost to the nation, NOAA requires comprehensive, integrated, and unified models of the Earth system linking the atmosphere, oceans, land, biosphere, cryosphere, and ecosystems. NOAA's ability to meet its mission through the delivery of continually improved products and services relies on the conversion of the best available research and development (R&D) endeavors into operation and application products, commercialization, and other uses. R&D HPC is critical to support research to operations.

This increase will provide dedicated funding support for Hera, the supercomputer located in Fairmont, West Virginia, that was initially funded through a supplemental appropriation. These resources provide essential infrastructure support and will continue to be a critical element of NOAA's HPC enterprise, especially as we move forward to new, advanced applications and architectures, such as artificial intelligence/machine learning.

Research is a core capability of NOAA. This request will help NOAA meet the Administration's climate research goals, including EO 14008, and is critical to ensuring NOAA produces research data, tools, and information products that are publically accessible to facilitate climate change decision-making Nation-wide.

Schedule and Milestones:
FY 2022

- Sustain NOAA's R&D HPC computational resources which support advances in environmental modeling crucial for understanding critical Earth system modeling issues

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

FY 2023 - FY 2026

- Maintain support for priority activities within available Research Supercomputing/CCRI funding

Deliverables:

- Provide dedicated funding for current R&D HPC capacity through recapitalization efforts

Performance Measures	2022	2023	2024	2025	2026
R&D HPCS PetaFlops					
With Increase	26	30	35	40	45
Without Increase	20	15.5	15.5	15.5	15.5

Outyear Costs:					
Direct Obligations	10,000	10,000	10,000	10,000	10,000
Capitalized	10,000	10,000	10,000	10,000	10,000
Uncapitalized	0	0	0	0	0
Budget Authority	10,000	10,000	10,000	10,000	10,000
Outlays	3,500	3,500	3,500	3,500	3,500
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Outyear Funding Estimates:

Subactivity/PPA	2021 & Prior	2022	2023	2024	2025	2026	CTC	Total
Change from 2022 Base	N/A	10,000	10,000	10,000	10,000	10,000	N/A	N/A
Total Request	484,644	53,500	53,500	53,500	53,500	53,500	N/A	Recurring

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition and Construction
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Systems Acquisition
Subactivity: Research Supercomputing

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	277	280	287	287	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	277	280	287	287	0
12	Civilian personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	0	0
22	Transportation of things	0	0	0	0	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	649	649	649	649	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	200	200	200	200	0
25.2	Other services from non-Federal sources	8,632	8,632	8,632	8,632	0
25.3	Other goods and services from Federal sources	21,294	21,294	21,294	21,294	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	411	411	411	411	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	2,347	2,347	2,347	2,347	0
31	Equipment	4,209	4,209	4,209	14,209	10,000
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	4,113	5,478	5,471	5,471	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	42,132	43,500	43,500	53,500	10,000

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Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
Budget Estimates, Fiscal Year 2022

Executive Summary

For FY 2022, NOAA requests a total of $1,328,748,000 and 4,368 FTE/4,421 positions for the National Weather Service (NWS) including a net increase of $59,310,000 and 18 FTE/23 positions in program changes.

The FY 2022 budget submission continues to work towards making the United States a Weather-Ready Nation (WRN) in which NWS operations help decision makers and the public best prepare for, and respond to, extreme weather events. NWS launched its WRN initiative to build community resilience in the face of increasing vulnerability to extreme weather and water events. Approaching the 10 year anniversary of the WRN initiative, the agency has transformed to one that fully embraces Impact-based Decision Support Services (IDSS) to core partners and outreach to communities and the public. The initiative improves support for management of the Nation's water supply, based upon an improved understanding of the Weather-Water-Climate linkage. Record-breaking snowfall, cold temperatures, extended drought, high heat, severe flooding, unprecedented wildfires, violent tornadoes, and massive hurricanes have all combined to cause frequent multi-billion dollar weather disasters, made even more difficult to support in the context of an ongoing pandemic. In 2020 alone, 22 weather, water, and climate disaster events, with losses exceeding $1 billion each, struck communities across the country[1]. The devastating impacts of climate related weather extremes can be reduced through improved readiness. The WRN initiative improves the Nation's weather-related resilience and will be accomplished through improvements to demand-driven support services and specialized training of the NWS.

As embodied in the NWS 2019 – 2022 Strategic Plan, "Building a Weather-Ready Nation,[1]" the NWS is evolving to meet changing and increasing needs for weather, water, and climate forecasts and warnings. As part of the "Evolve" strategy and direction from the *Weather Research and Forecasting Innovation Act of 2017 (Title IV)* (P.L. 115-25), NWS will work to better serve partners through IDSS, develop a flexible and nimble workforce, improve the effectiveness of forecasting in support of IDSS, match workforce to workload to enable rapid response during high impact events, and support continuous improvements through innovation.

Through FY 2020, NWS has made several improvements within current resources:

1. NWS established a standard definition for a Collaborative Forecast Process (CFP) that is guiding development of a plan for field demonstration. The CFP ensures NWS provides weather, water, and climate data forecasts and warnings for the protection of life and property and the enhancement of the national economy in the most efficient and effective way possible.

[1] https://www.ncdc.noaa.gov/billions

Regional Operations Centers were established with Initial Operating Capability at each of the six NWS Regional Headquarters. These elements all establish the building blocks for CFP to be evaluated and tested in FY 2021.

2. NWS extended the higher resolution global model ensemble from 16 to 35 days, implemented the next generation of the hurricane model and probabilistic storm surge in support of Hurricane forecasts and warnings.
3. NWS implemented the National Blend of Models (NBM) v. 3.2 into operations in February 2020, followed by the release of v. 4.0 in October 2020. The NBM is a nationally consistent suite of calibrated forecast guidance based on a blend of both NWS and non-NWS model output. The goal of the NBM is to create a highly accurate, skillful, and consistent starting point for forecasts and is a foundational component in evolving NWS capabilities to achieve a Weather-Ready Nation.

In FY 2021, NWS upgraded its flagship global weather model, the Global Forecast System, to v16.0.7. This upgrade improves hurricane genesis forecasting, modeling for snowfall location, heavy rainfall forecasts and overall model performance. This upgrade established a strong foundation for further planned enhancements that will allow for the assimilation of more data into the model. As part of NOAA's Agency Priority Goal to improve the Flood Inundation Mapping (FIM) capability, NWS validated flood inundation models and migrated services to the public cloud for development. The National Water Model (NWM) v2.1 Operational was released in April 2021 to include first-time coverage for Puerto Rico and the US Virgin Islands and the Great Lakes tributary domain. With Congress' support, NOAA was able to mitigate the COVID-19 driven impacts to the on-time delivery and transition period of the new Weather and Climate Operational Supercomputing System (WCOSS) by providing sufficient overlap between the legacy and replacement supercomputer systems. Additionally, NWS plans to begin a field demonstration in late FY 2021 to determine the viability of adopting a single nationwide Quantitative Precipitation Forecast (QPF) product for days 1 through 7 using the NBM and CFP aided by the Regional Operations Centers. NWS plans to expand and incorporate additional parameters into the CFP following the initial demonstration.

Working toward the goals identified in the NWS 2019 – 2022 Strategic Plan, "Building a Weather-Ready Nation", NWS aims to protect an increasingly vulnerable American population by providing accurate, consistent, and actionable NWS products and services. As directed in Executive Order (EO) 13985: *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*, NWS will work to recognize and redress inequities in policies and programs that serve as barriers to equal opportunity. Specifically, NWS will assess user needs in support of improving NWS services to underserved communities for severe weather events, such as tornadoes, hurricanes, and temperature extremes. NWS will work to enhance service delivery by increasing the availability of NWS products translated into Spanish. To improve the dissemination of weather information to vulnerable and underserved communities in both urban and rural geographies, NWS will expand communication through mobile and low-bandwidth technologies, as well as social media. In addition, NWS will optimize and upgrade the Integrated Dissemination Program (IDP) program in accordance with the plan provided to Congress, to ensure the public and core partners receive timely critical warnings, watches, and forecasts that protect lives and property.

NWS will also address the climate crisis as outlined in EO 14008: *Tackling the Climate Crisis at Home and Abroad*. To this end, NWS aims to increase lead time for climate-related weather extremes and improve decision support services for floods, fire and space weather. NWS will establish a Seasonal Forecast System (SFS) forecast capability to improve the skill, lead time, and breadth of weather and environmental prediction. This new model, coupled with sub-seasonal to seasonal decision support services will lead to improved mitigation planning, greater preparedness, and increased resilience for extreme events. To improve water-related IDSS, NWS will expand and operationalize the flood inundation mapping capability to nearly 100% of the continental U.S. population to effectively communicate and mitigate flood impacts and inform evacuations. To reduce the devastating impacts of future wildfires NWS will develop and implement a comprehensive, integrated, seamless suite of prediction and IDSS tools for fire weather. NWS will also develop a space weather testbed to ensure the Nation and communities worldwide are ready for and responsive to space-weather events that can have potential impacts to airline operations, communications networks, navigation systems, and the electric power grid.

NWS cannot achieve these goals without its dedicated workforce that provides services 24/7/365 in support of the mission to provide weather, water, and climate data forecasts and warnings for the protection of life and property and enhancement of the national economy. NWS aspires to have a diverse workforce that is representative of the greater U.S population and understands the unique needs of underrepresented and underserved communities. NWS proposes to expand the ability to transition eligible Black, Indigenous and People of Color (BIPOC) students in atmospheric sciences, engineering, data science, social science and software development to positions within the 150+ NWS offices embedded in communities across the Nation and other NWS corporate offices.

Significant Adjustments:

Inflationary Adjustments
NOAA's FY 2022 Base includes a net increase of $44,128,000 and 0 FTE/ 0 positions to account for the full funding requirement for certain inflationary adjustments to current programs for NWS activities. This includes inflationary increases for the estimated 2022 civilian pay raise of 2.7 percent and military pay raise of 2.7 percent, as well as inflationary increases for labor and non-labor activities including benefits and rent charges from the General Services Administration.

Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
Budget Estimates, Fiscal Year 2022

Technical Adjustments
NOAA requests the following transfers for a net change of $0 and 0 FTE/ 0 positions to the agency:

From Office	Subactivity	To Office	Subactivity	Amount
NWS	Observations (ORF)	OMAO	NOAA Commissioned Officer Corps (ORF)	$324,000 / 2 FTE/ 2 Positions
NWS	Central Processing (ORF)	OMAO	NOAA Commissioned Officer Corps (ORF)	$346,000 / 2 FTE/ 2 Positions
NWS	Analyze, Forecast and Support (ORF)	OMAO	NOAA Commissioned Officer Corps (ORF)	$54,000 / 1 FTE/ 1 Positions

NOAA requests to transfer $324,000 and 2 FTE/ 2 Positions from the Observations (ORF) PPA, $346,000 and 2 FTE/ 2 Positions from the Central Processing (ORF) PPA, and $54,000 and 1 FTE/ 1 Position from the Analyze, Forecast and Support (ORF) PPA to the OMAO NOAA Commissioned Officer Corps PPA to allow for better alignment of funding and greater transparency over the full cost of the NOAA Corps. With this transfer, funding for all NOAA Corps personnel will reside within OMAO. This increases efficiency within the program by reducing administrative burdens and allows NOAA to better manage personnel requirements consistent with the NOAA Corps Amendments Act of 2020.

Department of Commerce
National Oceanic and Atmospheric Administration
TRANSFER CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Observations (ORF)
Subactivity: Observations (ORF) transfer to NOAA Commissioned Officer Corps (ORF)

Object Class	2021 Enacted	2022 Transfer	2022 Base*
Full-time permanent compensation	72,872	(324)	72,548
Other than full-time permanent	112	0	112
Other personnel compensation	2,434	0	2,434
NOAA Corps	0	0	0
Total personnel compensation	75,418	(324)	75,094
Civilian personnel benefits	29,702	0	29,702
Benefits for former personnel	35	0	35
Travel and transportation of persons	886	0	886
Transportation of things	3,547	0	3,547
Rent, communications, and utilitites	0	0	0
Rental payments to GSA	5,915	0	5,915
Rental Payments to others	3,727	0	3,727
Communications, utilities and misc charges	11,770	0	11,770
Printing and reproduction	25	0	25
Advisory and assistance services	22,997	0	22,997
Other services from non-Federal sources	43,508	0	43,508
Other goods and services from Federal sources	1,502	0	1,502
Operation and maintenance of facilities	0	0	0
Research and development contracts	159	0	159
Medical care	0	0	0
Operation and maintenance of equipment	0	0	0
Subsistence and support of persons	0	0	0
Supplies and materials	22,830	0	22,830
Equipment	2,002	0	2,002
Lands and structures	18	0	18
Investments and loans	0	0	0
Grants, subsidies and contributions	3,139	0	3,139
Insurance claims and indemnities	0	0	0
Interest and dividends	5	0	5
Refunds	0	0	0
Total obligations	227,186	(324)	226,862

* Base column reflects the full 2022 base for the subactivity, including calculated ATBs and any additional transfers

Department of Commerce
National Oceanic and Atmospheric Administration
TRANSFER CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Central Processing (ORF)
Subactivity: Central Processing (ORF) transfer to NOAA Commissioned Officer Corps (ORF)

Object Class	2021 Enacted	2022 Transfer	2022 Base*
Full-time permanent compensation	28,065	(346)	27,719
Other than full-time permanent	81	0	81
Other personnel compensation	845	0	845
NOAA Corps	0	0	0
Total personnel compensation	28,991	(346)	28,645
Civilian personnel benefits	11,053	0	11,053
Benefits for former personnel	18	0	18
Travel and transportation of persons	228	0	228
Transportation of things	120	0	120
Rent, communications, and utilitites	0	0	0
Rental payments to GSA	3,456	0	3,456
Rental Payments to others	0	0	0
Communications, utilities and misc charges	483	0	483
Printing and reproduction	10	0	10
Advisory and assistance services	6,969	0	6,969
Other services from non-Federal sources	27,688	0	27,688
Other goods and services from Federal sources	599	0	599
Operation and maintenance of facilities	0	0	0
Research and development contracts	0	0	0
Medical care	0	0	0
Operation and maintenance of equipment	0	0	0
Subsistence and support of persons	0	0	0
Supplies and materials	11,613	0	11,613
Equipment	5,429	0	5,429
Lands and structures	0	0	0
Investments and loans	0	0	0
Grants, subsidies and contributions	68	0	68
Insurance claims and indemnities	0	0	0
Interest and dividends	4	0	4
Refunds	0	0	0
Total obligations	96,727	(346)	96,383

* Base column reflects the full 2022 base for the subactivity, including calculated ATBs and any additional transfers

Exhibit 3T

Department of Commerce
National Oceanic and Atmospheric Administration
TRANSFER CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Analyze, Forecast and Support (ORF)
Subactivity: Analyze, Forecast and Support (ORF) transfer to NOAA Commissioned Officer Corps (ORF)

	Object Class	2021 Enacted	2022 Transfer	2022 Base*
11.1	Full-time permanent compensation	297,132	(54)	297,078
11.3	Other than full-time permanent	888	0	888
11.5	Other personnel compensation	25,747	0	25,747
11.7	NOAA Corps	0	0	0
11.9	Total personnel compensation	323,767	(54)	323,713
12	Civilian personnel benefits	118,064	0	118,064
13	Benefits for former personnel	290	0	290
21	Travel and transportation of persons	1,660	0	1,660
22	Transportation of things	2,061	0	2,061
23	Rent, communications, and utilitites	0	0	0
23.1	Rental payments to GSA	16,240	0	16,240
23.2	Rental Payments to others	4,076	0	4,076
23.3	Communications, utilities and misc charges	11,503	0	11,503
24	Printing and reproduction	63	0	63
25.1	Advisory and assistance services	12,895	0	12,895
25.2	Other services from non-Federal sources	29,556	0	29,556
25.3	Other goods and services from Federal sources	2,286	0	2,286
25.4	Operation and maintenance of facilities	0	0	0
25.5	Research and development contracts	1	0	1
25.6	Medical care	0	0	0
25.7	Operation and maintenance of equipment	0	0	0
25.8	Subsistence and support of persons	0	0	0
26	Supplies and materials	5,809	0	5,809
31	Equipment	1,039	0	1,039
32	Lands and structures	28	0	28
33	Investments and loans	0	0	0
41	Grants, subsidies and contributions	7,528	0	7,528
42	Insurance claims and indemnities	2	0	2
43	Interest and dividends	4	0	4
44	Refunds	0	0	0
99	Total obligations	536,872	(54)	536,818

* Base column reflects the full 2022 base for the subactivity, including calculated ATBs and any additional transfers

Exhibit 10

Department of Commerce
National Oceanic and Atmospheric Administration
PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS
(Dollar amounts in thousands)

National Weather Service (NWS)		2020 Actual		2021 Enacted		2022 Base		2022 Estimate		Increase/Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Observations	Pos/BA	702	230,346	716	227,186	714	235,107	714	244,222	0	9,115
	FTE/OBL	682	234,541	710	227,186	708	235,107	708	244,222	0	9,115
Central Processing	Pos/BA	226	97,545	226	96,727	224	102,069	224	108,472	0	6,403
	FTE/OBL	219	97,124	223	96,727	221	102,069	221	108,472	0	6,403
Analyze, Forecast and Support	Pos/BA	2,870	517,419	2,930	536,872	2,929	559,719	2,933	565,097	4	5,378
	FTE/OBL	2,842	528,184	2,899	536,872	2,898	559,719	2,901	565,097	3	5,378
Dissemination	Pos/BA	75	76,675	78	78,344	78	80,828	78	117,646	0	36,818
	FTE/OBL	74	76,732	77	78,344	77	80,828	77	117,646	0	36,818
Science and Technology Integration	Pos/BA	418	146,797	427	153,499	427	158,309	446	181,148	19	22,839
	FTE/OBL	416	163,183	421	153,499	421	158,309	436	181,148	15	22,839
Total NWS – ORF	Pos/BA	4,291	1,068,782	4,377	1,092,628	4,372	1,136,032	4,395	1,216,585	23	80,553
	FTE/OBL	4,233	1,099,764	4,330	1,092,628	4,325	1,136,032	4,343	1,216,585	18	80,553
Systems Acquisition	Pos/BA	21	92,465	26	123,406	26	123,406	26	102,163	0	-21,243
	FTE/OBL	22	156,727	25	123,406	25	123,406	25	102,163	0	-21,243
Construction	Pos/BA	0	9,833	0	10,000	0	10,000	0	10,000	0	0
	FTE/OBL	0	6,695	0	10,000	0	10,000	0	10,000	0	0
Total NWS – PAC	Pos/BA	21	102,298	26	133,406	26	133,406	26	112,163	0	-21,243
	FTE/OBL	22	163,422	25	133,406	25	133,406	25	112,163	0	-21,243
Total NWS	Pos/BA	4,312	1,171,080	4,403	1,226,034	4,398	1,269,438	4,421	1,328,748	23	59,310
	FTE/OBL	4,255	1,263,186	4,355	1,226,034	4,350	1,269,438	4,368	1,328,748	18	59,310

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Observations
Subactivity: Observations

Goal Statement

NWS is fundamentally dependent on environmental observations, from the surface of the sun to the bottom of the sea, to meet its forecast and warnings mission. NWS integrates in-situ and remotely-sensed data from satellites and radars, NOAA systems, commercial sources, Federal, and even international partners in support of the Department of Commerce 2018-2022 Strategic Plan, Strategic Objective 3.3 Reduce Extreme Weather Impacts.

Base Program

Funding from this Activity is used to operate and maintain all NWS observing systems, evaluate observational requirements, engineer technical solutions, and perform systems development and testing. Together, these systems enable forecasters to identify emerging threats, characterize their severity, and provide detailed warnings and forecasts.

Observing systems must measure a broad array of parameters to support forecasting in the varied mission service areas of the NWS including aviation weather, severe weather, space weather, tropical weather, and more. All of these systems have strengths and weaknesses in monitoring the environment, so individual systems in the overall suite must complement each other. By gathering information from multiple sources, NWS ensures the most complete data picture possible.

Specific activities in Observations include:

- Manage operations and maintenance of NWS observational systems;
- Provide holistic, ongoing assessments/analyses of the observing systems portfolio;
- Identify and validate NWS' observation requirements;
- Seek solutions to fulfill NWS' observation requirements;
- Develop a strategy to maximize effectiveness while minimizing cost; and,
- Coordinate NWS' observing system activities with NOAA and its partners.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Statement of Operating Objectives

Schedule and Milestones:
FY 2022 – FY 2026

- Sustain the tri-agency Next Generation Weather Radar (NEXRAD) radar network
- Sustain the radiosonde network
- Sustain the tri-agency Automated Surface Observing System (ASOS)
- Operate and maintain Coastal Weather Buoys (CWB), Coastal Marine Automated Networks (C-MAN), Deep-ocean Assessment and Reporting of Tsunamis (DART), and Tropical Atmosphere Ocean (TAO) buoy arrays
- Sustain data processing of the National Solar Observatory's (NSO) Global Oscillation Network Group (GONG) and observatory support
- Maintain paperless reporting of Cooperative Observer Program (COOP) data
- Develop, test, and deploy NEXRAD Radar Product Generator (RPG) and Radar Data Acquisition (RDA) Software Builds
- Develop, test, and deploy Terminal Doppler Weather Radar (TDWR) Supplemental Product Generator (SPG) Builds
- Develop, test, and deploy NOAA Profiler Network Software Builds
- Provide hardware and software support for systems acquiring data in support of World Meteorological Organization Integrated Global Observing System (WIGOS) and ensure World Meteorological Organization compliance

Deliverables:

- Support operations of 122 NEXRAD systems at 90 percent availability
- Support operations of 45 TDWR SPG systems
- Support operations of 102 radiosonde stations in the United States and its territories, Caribbean, and Pacific Island nations
- Support operations of 309 NWS ASOS units and maintenance of up to 570 Federal Aviation Administration (FAA) and 97 Department of Defense (DoD) ASOS units under a reimbursable funding arrangement at 96 percent availability
- Support operations of 104 Coastal Weather Buoys (CWB) systems at 75 percent availability (assumes adequate ship time provided by the U.S. Coast Guard) to provide hourly marine weather wind speed and direction, air and sea temperature, atmospheric pressure, and detailed wave information
- Support operations of 44 C-MAN stations at 75 percent availability
- Support operations of 39 DART buoys with availability of 65 percent
- Support operations of the TAO buoy array at 80 percent availability (assumes adequate ship time provided by NOAA Office of Marine and Aviation Operations)
- Continuity of GONG data to the Space Weather Prediction Center

- Support operations of three Wind Profiler systems in Alaska at 96 percent availability
- Implement a long-term operationally supported Multi-Radar / Multi-System into NWS Operations
- Leverage data flow from aircraft observations commercial data purchases
- Maintain National Mesonet Program Office and leverage data flow from commercial data purchases
- Leverage data flow from lightning commercial data purchases
- Leverage data flow from ship meteorological and oceanographic observations data purchases
- Support strategic and tactical ice analysis services by leveraging data from foreign satellite data purchases and providing support for the International Arctic Buoy Program
- Increase interoperability of observation data formats with key international partners
- Provide maintenance, repair, quality assurance, and warehousing of new and reconditioned parts;
- Develop and maintain software for observing systems; and,
- Perform system and operational tests and evaluation of alternative systems.

Without the continued support for Upper Air, Radar, Surface, and Marine observations and associated sustainment, provided for in Observations ORF, NWS cannot sustain or further enhance observation capabilities and outputs by: (1) improving assimilation of data collected by NWS and others; (2) improving research community collaboration through creative approaches; (3) improving the techniques used by expert forecasters; (4) making NWS information available quickly, efficiently, and in useful forms; (5) incorporating forecast uncertainty to help customers make better-informed decisions; (6) leveraging emerging technologies to disseminate information; and (7) maintaining an up-to-date technology base and a trained workforce to integrate these tools to maximum effect. Furthermore, availability of buoy data will decrease, as level funding for contract maintenance cruises buys fewer days at sea, reducing the number of buoys that can be maintained annually.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Explanation and Justification

		2020 Actual		2021 Enacted		2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Observations	Pos/BA	702	230,346	716	227,186	714	235,107
	FTE/OBL	682	234,541	710	227,186	708	235,107

In FY 2022, the Observations portfolio will support the observing systems, such as the NEXRAD, ASOS, and radiosondes that collect data necessary to provide weather forecasts, warnings, and outlooks. They will also operate and maintain multiple networks of weather/ocean buoys, and develop, test and deploy software builds for the NEXRAD RPG and RDA, the TDWR SPG, and the NOAA Profiler Network.

In FY 2021, NWS is maintaining an average, cross platform buoy availability rate of 80 percent, a NEXRAD system availability rate of 96 percent and an ASOS system availability rate of 96 percent. In FY 2022, NWS will continue to maintain its critical observing systems while improving their sustainability through configuration management and sustaining engineering.

Under Observations, NWS maintains the following programs to accomplish this activity:

Upper Air Observations Program provides a vertical profile of meteorological data across the Earth's atmosphere. To provide humidity, pressure, and other data that shape weather forecasts, NWS operates a radiosonde network, acquires observations from private and commercial aircraft, acquires lightning data from commercial vendors, and operates a wind profiler network in Alaska. In addition, the program provides for critical, terrestrial-based space weather observations.

- Each year, NWS launches over 78,000 radiosondes from locations throughout the United States and its territories, including the Caribbean and Pacific Island nations. Radiosondes provide atmospheric profiles of pressure, temperature, relative humidity and winds aloft. These data are critical inputs for NWS weather prediction models and forecaster operations supporting severe storm, aviation and marine forecasts, and climate and other research uses. Radiosondes also serve to provide a reference for satellite sounding data.
- NWS leverages private-public partnerships to obtain additional data for more comprehensive upper air observations. Meteorological Data, Collection and Reporting System-equipped aircraft currently provide temperature and wind information.
- The Alaskan NOAA Profiler Network consists of three Doppler radar sites providing continuous vertical wind profile data. The

most critical use of the Alaska profiler network is to support the production of aviation warnings of volcanic ash, which can cause catastrophic engine failure for aircraft in flight.

- NWS supports the NSO GONG. GONG consists of six ground-based observatories strategically placed around the globe, so that at least one site has the opportunity to observe the sun at all times.

Radar Observations Program provides meteorological data about clouds and precipitation that can predict storm impacts and severity. To produce timely and accurate storm data, NWS operates 122 NEXRADs and acquires supplementary radar data from other sources.

- NEXRAD is a tri-agency weather radar system with NWS, the DoD and FAA. NEXRAD is the primary tool used by NOAA's meteorologists for issuing warnings for flash floods, tornadoes, and severe thunderstorms.
- NWS leverages other radar data sources such as the FAA's TDWR to supplement the NEXRAD network to ensure adequate national radar coverage.

Surface Observations Program provides meteorological data at the Earth's surface. To provide on-the-ground observations, NWS operates the ASOS, the Cooperative Observer Program (COOP) and the National Mesonet Program.

- ASOS is the Nation's primary surface weather observing network supporting aviation operations and the needs of the meteorological, hydrological, and climatological research communities. ASOS is a tri-agency automated surface observation system with NWS, FAA, and DoD and consists of 976 operational systems.
- COOP is a network of volunteer observers providing a significant and cost effective source of meteorological and climatological data representative of where our citizens live, work, and play. The COOP data are the primary data utilized in the NWS snowfall forecast guidance.
- The National Mesonet Program is a network of automated weather stations located in areas most susceptible to tornadoes and installed closely together to gather "mesoscale meteorological" observations such as temperature, humidity, lightning, and atmospheric pressure. Due to their proximity to each other, Mesonet data can identify small-scale features at the surface that can indicate rapidly deteriorating weather conditions not shown by other observations.

Marine Observations Program provides real-time meteorological, oceanographic and climatological data in the open ocean and coastal zones surrounding the United States. NWS operates the Weather and Ocean Platform network, the TAO buoy array, the DART buoy program, and the Voluntary Observing Ship (VOS) program.

- The Coastal Weather Buoys and C-MAN stations are meteorological and ocean observing platforms that provide real-time marine meteorological, oceanographic, and geophysical observations. The 96 moored buoys and 44 land-based C-MAN

stations operate in the coastal US and offshore waters from the western Atlantic, Gulf of Mexico, and Caribbean Sea to the western Pacific around Hawaii, to the Bering Sea, and in the Great Lakes. The buoys and C-MAN stations provide forecasters and the public with frequent, high-quality marine observations for forecast and warning preparation (including for hurricanes) and to verify forecasts after they are produced. Other users rely on the observations and forecasts for commercial and recreational activities.

- The TAO buoy array is designed for the study of sub-seasonal to seasonal and year-to-year climatic variations related to El Niño and the Southern Oscillation that can have tremendous impact on the Nation's weather. These data are used to produce NWS' seasonal outlooks. Like shorter-term forecasting, the study of this variability enables more rapid prediction of climate anomalies that may result in hazardous weather conditions within the United States. The array consists of 40 moored ocean buoys and four Acoustic Doppler Current Profilers in the equatorial Pacific.
- The DART buoy network, located along the 'ring of fire' throughout the Pacific Ocean, and in the Atlantic Ocean, Caribbean Sea and Gulf of Mexico, collects observational data that is used by NWS' Tsunami Warning Center to prepare and refine tsunami watches and warnings covering all U.S. territories and coastal states.
- NWS operates the VOS program, which obtains ship-based weather and oceanographic observations used in marine weather forecasts in both coastal and high seas areas, and informs local surface conditions. The VOS program is supported by NWS Port Meteorological Officers located at twelve major port cities across the country. To improve tropical and marine watches, warnings, and global modeling, the *Consolidated Appropriations Act, 2020* (P.L. 116-93) included funding for a data buy contract for meteorological and oceanographic observations from ships.
- Acquires meteorological and oceanographic observations from ships to improve tropical and marine watches and warnings, as well as global weather models.

Systems Engineering and Support provides systems acquisition, engineering, and logistics support for NWS mission critical observing systems, as well as the functional expertise necessary to design, acquire, test and provide life cycle support. Actions include:

- Perform system engineering and acquisition to support operational weather systems.
- Plan, coordinate, and implement hardware modifications, retrofits and rehabilitation programs to meet changing program requirements and improving system performance.
- Direct product identification, configuration control, auditing, and status accounting for all systems that are under formal NWS Configuration Management control.
- Prescribe and manage efficient logistics for stocking levels (i.e. level of stock needed to balance the need for the part, without carrying the overhead of having unneeded items on hand) and ensuring procurement of initial and replenishment spares for

depot-level stock (i.e. required level of on-hand spare parts inventory needed to repair a particular system or system component).

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Direct Obligations amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Observations	Pos./BA	714	235,107	714	236,307	0	1,200
	FTE/OBL	708	235,107	708	236,307	0	1,200

Enhance the Meteorological Assimilation Data Ingest System (MADIS) to include important climate datasets (+1,200, 0 FTE/ 0 Positions) – This request will update MADIS to enable climate observations from over 8,200 Cooperative Observer Program (COOP) stations to be readily accessible by climate and weather models and research communities. The current data architecture for COOP inhibits climate models and researchers from readily accessing these key datasets. This hampers NWS efforts to provide real-time products and information that predict and describe climate variations on timescales from weeks to years, adversely impacting effective management of climate risk and a climate-resilient society. This redesign will include these neglected, yet valuable, data collected in nearly every county in the Nation.

MADIS is a meteorological observational database and data delivery system that provides many of NWS' observations that cover the globe. However, the current design of MADIS cannot accommodate the ingestion, dissemination, and accessibility of COOP observations, a vital dataset for climate modeling as well as for analyzing weather conditions where observations are otherwise lacking.

This initiative will fund contract software development expertise to reconstruct and optimize the MADIS software design to allow for flexibility in accepting COOP observations, and add the capability to deliver vital data garnered from the COOP stations for use in climate and weather prediction models. The software will also be updated to increase access to the climate data provided by COOP sites for use in drought monitoring and state and national climatological assessments, and would facilitate databasing and delivery of other observations required to enhance NOAA's weather, water and climate missions.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Direct Obligations amounts in thousands)

Schedule and Milestones:
FY 2022 – FY 2026

- FY 2022
  - Award contract for development of MADIS software updates
- FY 2023 - FY 2024
  - Restructure and optimize MADIS design and code to accommodate COOP and other weather, water and climate-related observations of opportunity
  - Test redesigned software and associated data path changes with the 32 COOP sites outfitted with upgraded test communications and formats
- FY 2025
  - Test redesigned software and associated data path changes with 2,000 COOP sites outfitted with legacy communications and formats
  - Enhance software to include other climate-related observations for more efficient handling of data
- FY 2026
  - Implement upgraded MADIS software to operationally handle all COOP stations with both legacy and improved communications

Deliverables:

- Updated MADIS software to accommodate COOP observations, both with and without updated communications
- Enhanced MADIS infrastructure robust enough to consider additional climate-related observations to gain efficiencies in how NWS enables climate-related data of this type readily accessible for use by researchers and by operational models and forecasters

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Direct Obligations amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of COOP sites in MADIS					
With Increase	0	0	32	2,032	7,700
Without Increase	0	0	0	0	0
Number of COOP Observations per day in MADIS					
With Increase	0	0	768	2,768	8,468
Without Increase	0	0	0	0	0
Direct Obligations	1,200	1,200	1,200	1,200	1,200
Capitalized	1,200	1,200	1,200	1,200	1,200
Uncapitalized	0	0	0	0	0
Budget Authority	1,200	1,200	1,200	1,200	1,200
Outlays	744	744	744	744	744
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Observations
Subactivity: Observations

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	69,630	72,872	74,837	74,837	0
11.3	Other than full-time permanent	105	112	114	114	0
11.5	Other personnel compensation	2,323	2,434	2,489	2,489	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	72,058	75,418	77,440	77,440	0
12	Civilian personnel benefits	27,937	29,702	33,200	33,200	0
13	Benefits for former personnel	32	35	39	39	0
21	Travel and transportation of persons	1,007	886	902	902	0
22	Transportation of things	4,128	3,547	3,630	3,630	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	5,664	5,915	5,930	5,930	0
23.2	Rental Payments to others	3,653	3,727	3,839	3,839	0
23.3	Communications, utilities and misc charges	11,502	11,770	12,111	12,111	0
24	Printing and reproduction	27	25	25	25	0
25.1	Advisory and assistance services	26,017	22,997	23,453	23,453	0
25.2	Other services from non-Federal sources	46,402	43,508	44,295	45,495	1,200
25.3	Other goods and services from Federal sources	1,634	1,502	1,527	1,527	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	185	159	163	163	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	28,369	22,830	23,277	23,277	0
31	Equipment	2,289	2,002	2,043	2,043	0
32	Lands and structures	21	18	19	19	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	3,609	3,139	3,209	3,209	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	5	5	5	5	0
44	Refunds	0	0	0	0	0
99	Total obligations	234,541	227,186	235,107	236,307	1,200

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Observations	Pos./BA	714	235,107	714	237,548	0	2,441
	FTE/OBL	708	235,107	708	237,548	0	2,441

Improve Climate and Weather Predictions by maintaining a recapitalized Tropical Atmosphere Ocean (TAO) array (+$2,441, 0 FTE/ 0 Positions) – This request addresses a much-needed overhaul of the long-standing TAO array in the Tropical Pacific. The existing TAO array, consisting of 55 moorings in the Tropical Pacific Ocean, measures marine weather and subsurface ocean parameters to a depth of 500 meters. These data are critical to understanding and predicting El Niño Southern Oscillation (ENSO). ENSO includes such phenomena as El Niño and La Niña, which have a substantial impact on the United States and global weather through floods, droughts, forest fires, tropical cyclones, and other severe weather events. The present monitoring system is obsolete and is becoming unsustainable. NOAA is requesting a total of $10.5 million for modernizing the TAO array, also including $8.1 million in Observations PAC [NWS-178].

This request will enable NWS to deploy and maintain the modernized moorings and sensors, and provide additional capability to measure key weather and ocean parameters in real-time at the optimal vertical resolution based on the best science available. In addition to improved system availability, the increased capability and modernized sensors and electronics are expected to produce improved analyses and forecasts of climate events such as ENSO, and improved weather warnings and forecasts for the NWS Pacific Region. An enhancement of the observing capabilities for the array, as defined in the “Tropical Pacific Observing System (TPOS) 2020 Project” will greatly improve ocean monitoring to support forecasting for sub-seasonal to seasonal weather events and climate monitoring and research.

This investment is for deployment and ongoing maintenance of the recapitalized moorings, sensors and equipment, and will increase the capabilities for collecting ocean observations as recommended by the TPOS 2020 report. It also includes required resources for additional contract ship time provided through the NOAA Fleet Council Fleet Allocation Plan, for ongoing maintenance of the moorings, improving system performance and the availability of observations. This proposal is for additional funding for vessel charters that are under NOAA contract, not for buying more time on NOAA fleet vessels. Without this needed investment, NWS will fail to meet its TAO operational availability and data requirements, as the sensors and equipment continue to fail, increasingly over

time. NOAA presently struggles to maintain system availability at 80%, adversely impacting confidence in our analyses and subsequent forecasts.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022 - FY 2026

- FY 2022
  - Begin deploying sensors and equipment in the existing TAO array
- FY 2023 - FY 2025
  - Deploy the new buoys/sensors listed above in the existing TAO array
- FY 2026
  - Maintain the new buoys/moorings

Deliverables:

- For weather measurements: expanding beyond surface air temperature, humidity, and winds, to include barometric pressure, precipitation and shortwave & longwave radiation measurements
- For subsurface ocean measurements: additional undersea temperature sensors in the mixed layer for a total of at least 13 subsurface depths per mooring, plus the addition of ocean salinity measurements at some locations, and real-time subsurface ocean current profile measurements and near-surface ocean velocity at select locations

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
System availability of TAO network					
With Increase	80%	80%	80%	80%	80%
Without Increase	80%	70%	60%	55%	50%
Direct Obligations	2,441	2,441	2,441	2,441	2,441
Capitalized	0	0	0	0	0
Uncapitalized	2,441	2,441	2,441	2,441	2,441
Budget Authority	2,441	2,441	2,441	2,441	2,441
Outlays	1,513	1,513	1,513	1,513	1,513
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Observations
Subactivity: Observations

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	69,630	72,872	74,837	74,837	0
11.3	Other than full-time permanent	105	112	114	114	0
11.5	Other personnel compensation	2,323	2,434	2,489	2,489	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	72,058	75,418	77,440	77,440	0
12	Civilian personnel benefits	27,937	29,702	33,200	33,200	0
13	Benefits for former personnel	32	35	39	39	0
21	Travel and transportation of persons	1,007	886	902	902	0
22	Transportation of things	4,128	3,547	3,630	3,630	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	5,664	5,915	5,930	5,930	0
23.2	Rental Payments to others	3,653	3,727	3,839	3,839	0
23.3	Communications, utilities and misc charges	11,502	11,770	12,111	12,111	0
24	Printing and reproduction	27	25	25	25	0
25.1	Advisory and assistance services	26,017	22,997	23,453	23,453	0
25.2	Other services from non-Federal sources	46,402	43,508	44,295	46,736	2,441
25.3	Other goods and services from Federal sources	1,634	1,502	1,527	1,527	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	185	159	163	163	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	28,369	22,830	23,277	23,277	0
31	Equipment	2,289	2,002	2,043	2,043	0
32	Lands and structures	21	18	19	19	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	3,609	3,139	3,209	3,209	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	5	5	5	5	0
44	Refunds	0	0	0	0	0
99	Total obligations	234,541	227,186	235,107	237,548	2,441

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Observations	Pos./BA	714	235,107	714	235,857	0	750
	FTE/OBL	708	235,107	708	235,857	0	750

Enterprise Infrastructure Solutions (EIS) (+$750, 0 FTE/ 0 Positions) – This increase will enable NOAA to conduct a technology modernization and support an accelerated transition of telecommunications services to the GSA EIS contract vehicle. DOC currently uses GSA's Networx, Washington Interagency Telecommunications System 3, and regional contracts to acquire telecommunication services. These contracts expire in May 2023. Between now and then, DOC will be transitioning telecommunications services to the GSA EIS follow-on contract. The total NWS request for this initiative is $12.6 million, which includes $11.4 million in Dissemination ORF [NWS-127], $0.75 million in Observations ORF, and $0.47 million in Observations PAC [NWS-182]. All three NWS program increases are part of a non-severable initiative. Additional NOAA EIS requests can be found in Mission Support [MS-66], NOS [NOS-48; NOS-88; NOS-120; NOS-149], NMFS [NMFS-70], NESDIS [NESDIS-37], and OMAO [OMAO-19].

Specifically, this request focuses on EIS for NOAA Weather Radio (NWR), surface observing (ASOS) and radar (NEXRAD) circuits. NWS is required to transition all circuits provisioned by the Dissemination and Observation portfolios to facilitate these communications, necessitating the purchase of new hardware. There will be costs for trenching and laying these new lines, procurement, and implementation of network hubs to allow communications on NWS networks between the legacy vendors and the new vendor circuits during the transition period. NWS also requires support services to facilitate the architecture and installations throughout the transition. NWS anticipates it will take up to 5 years to transition all circuits to the new contract.

If NWS does not move to quickly transition to EIS before the expiration of the Networx contract, there are two risks:

1) Circuits will be disconnected by the vendor placing mission operations at risk
2) The incumbent Networx vendor will move the circuit to a month-to-month commercial circuit, which could double or triple the cost, depending on the location and technology. These levels are not affordable within the program.

The modernization enables NOAA to re-architect its network infrastructure to gain efficiencies and resilience, realize significantly reduced costs for network services after transition, and minimize risk as legacy services are discontinued. Increased funding will

accelerate the transition and enable NOAA to: (a) contract for engineering services to re-architect the network infrastructure and establish detailed transition plans; (b) issue awards for new hardware and telecommunication services; (c) trench and lay new lines, decommission and provision circuits; and (d) establish funding for administrative services to provide ordering, invoice processing, and inventory management. By expediting the technology modernization and migration to the new EIS vendors, NOAA will realize significant reductions in price and cost-avoidance. This funding will reduce risks related to service delivery and operations due to termination of GSA legacy service contracts.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

'Schedules and Milestones', 'Deliverables', and 'Performance Measures' reflect the outcomes resulting from all three NWS program increases given the non-severability of these initiatives.

Schedule and Milestones:

FY 2022 – FY 2026
FY 2022

- Establish contractual services for the required level of support to plan and engineer the transition
- Award NOAA task orders under EIS to support modernization needs
- Establish a sustainable, resilient architecture to meet NWS's current and planned needs
- Begin transition of NWS Legacy GSA inventory to EIS
- Transition 86 ASOS SLEP sites
- Procure 500 NWR IP circuits
- Transition 237 NWR sites
- Transition 10 One NWSNet sites
- Establish 2 hubs for legacy and new circuits to communicate
- Transition 53 NEXRAD landlines

FY 2023

- Transition 53 NEXRAD landlines
- Transition 4 NEXRAD VSATs
- Transition 10 NEXRAD 4G sites
- Transition 300 ASOS SLEP sites

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

- Procure 400 NWR IP circuits
- Transition 237 NWR sites
- Transition 60 One NWSNet sites
- Establish 10 hubs for legacy and new circuits to communicate
- Maintain and support transitioned NWR lines and circuits

FY 2024

- Transition 53 NEXRAD landlines
- Transition 12 NEXRAD VSATs
- Transition 50 NEXRAD 4G sites
- Transition 199 ASOS SLEP sites
- Transition 237 NWR circuits
- Transition 60 NWSNet sites
- Maintain 12 hubs for legacy and new circuits to communicate
- Maintain and support transitioned NWR lines and circuits

FY 2025

- Transition 53 NEXRAD landlines
- Transition 12 NEXRAD VSATs
- Transition 50 NEXRAD 4G sites
- Transition 100 ASOS SLEP sites
- Transition 237 NWR circuits
- Transition 60 NWSNet sites
- Decrease hubs to 5 for legacy and new circuits to communicate
- Maintain and support transitioned NWR lines and circuits

FY 2026

- Transition 53 NEXRAD landlines
- Transition 12 NEXRAD VSATs
- Transition 50 NEXRAD 4G sites
- Transition 60 NWSNet sites
- Maintain 5 hubs for legacy and new circuits to communicate
- Maintain and support all NWR lines and circuits

Deliverables:

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

- Modernized telecommunications infrastructure capable of meeting the agency's mission
- Provide a centralized ordering and management platform
- Provide a secure infrastructure resistant to extreme weather impacts

Performance Measures	2022	2023	2024	2025	2026
Percentage of circuits transitioned to the new EIS contract					
With Increase	15	40	65	90	100
Without Increase	0	10	20	30	40
Outyear Costs:					
Direct Obligations	750	750	750	750	750
Capitalized	0	0	0	0	0
Uncapitalized	750	750	750	750	750
Budget Authority	750	750	750	750	750
Outlays	465	465	465	465	465
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Observations
Subactivity: Observations

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	69,630	72,872	74,837	74,837	0
11.3	Other than full-time permanent	105	112	114	114	0
11.5	Other personnel compensation	2,323	2,434	2,489	2,489	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	72,058	75,418	77,440	77,440	0
12	Civilian personnel benefits	27,937	29,702	33,200	33,200	0
13	Benefits for former personnel	32	35	39	39	0
21	Travel and transportation of persons	1,007	886	902	902	0
22	Transportation of things	4,128	3,547	3,630	3,630	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	5,664	5,915	5,930	5,930	0
23.2	Rental Payments to others	3,653	3,727	3,839	3,839	0
23.3	Communications, utilities and misc charges	11,502	11,770	12,111	12,861	750
24	Printing and reproduction	27	25	25	25	0
25.1	Advisory and assistance services	26,017	22,997	23,453	23,453	0
25.2	Other services from non-Federal sources	46,402	43,508	44,295	44,295	0
25.3	Other goods and services from Federal sources	1,634	1,502	1,527	1,527	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	185	159	163	163	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	28,369	22,830	23,277	23,277	0
31	Equipment	2,289	2,002	2,043	2,043	0
32	Lands and structures	21	18	19	19	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	3,609	3,139	3,209	3,209	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	5	5	5	5	0
44	Refunds	0	0	0	0	0
99	Total obligations	234,541	227,186	235,107	235,857	750

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Central Processing
Subactivity: Central Processing

Goal Statement

Central Processing is the next step in the NWS forecast process. Through this Activity, NWS ingests data obtained from observing infrastructure, and delivers it in a usable form to NWS modelers and meteorologists in support of the Department of Commerce 2018-2022 Strategic Plan, Strategic Objective 3.3 Reduce Extreme Weather Impacts.

Base Program

Activities under Central Processing include managing the Weather and Climate Operational Supercomputing System (WCOSS), the Advanced Weather Interactive Processing System (AWIPS), hydrology information technology initiatives, and the information technology (IT) infrastructure that supports national centers and field operations. Together these ensure the uninterrupted flow of information from collection of observations to central guidance production and local access to all essential weather and climate data products.

Specific activities in Central Processing include:

- Operate NWS' IT processing infrastructure;
- Sustain reliability of NWS' IT processing by keeping infrastructure up to date;
- Identify NWS' processing requirements and gaps;
- Review NWS' processing system capabilities;
- Seek solutions to fulfill NWS processing requirements;
- Coordinate NWS' processing system activities across NOAA; and,
- Maintain a 24/7 help desk for all forecast systems.

Statement of Operating Objectives

Schedule and Milestones:

FY 2022 – FY 2026

- Manage high performance computing usage, reliability, and resources including a major system upgrade

- Support scheduled improvements to National Centers for Environmental Prediction (NCEP) production suite
- Deploy updated AWIPS hardware infrastructure at National Centers
- Maintain updated AWIPS architecture and infrastructure at National Centers, Weather Forecast Offices (WFOs), and River Forecast Centers (RFCs)
- Continue to improve flood lead time and accuracy improvement

Deliverables:

- WCOSS meeting or exceeding reliability metrics
- 43 million numerical prediction products produced per day for weather, climate, ocean, river, and space-weather forecasts
- 4,011 operational Advanced Hydrologic Prediction System (AHPS) forecast locations
- AHPS performance meeting or exceeding flood lead time and accuracy goals
- National Center and Regional IT infrastructure that meets operational reliability goals through improved annual maintenance

Explanation and Justification

		2020 Actual		2021 Enacted		2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Central Processing	Pos/BA	226	97,545	226	96,727	224	102,069
	FTE/OBL	219	97,124	710	96,727	221	102,069

In 2020, NWS completed the implementation of an initial operational capability of AWIPS Hazard Services which simplifies and modernizes the software forecasters use to generate lifesaving watches and warnings. AWIPS II is an underlying software design enhancement that enables the AWIPS software, NWS' primary forecasting software, to more rapidly integrate new data sources and forecast capabilities into operations while improving system maintainability. In FY 2020, NWS awarded a new follow-on Weather and Climate Operational Supercomputing System (WCOSS) contract. In FY 2022, NWS will continue to integrate new forecast capabilities into AWIPS and will complete the transition of operations to high performance computing systems under a new WCOSS contract to enable future model improvements.

Central Processing maintains the following programs to accomplish this activity:

NCEP Central Operations (NCO) provides support for WCOSS including the software and infrastructure that forms the basis for predictions from NCEP Centers and WFOs through its Weather and Climate Computing Infrastructure Services (WCCIS) program. WCCIS provides the following services:

- Performs quality assurance of incoming observations and outgoing products;
- Transitions and disseminates numerical weather and climate prediction models from development into operational use by forecasters at NCEP and the WFOs;
- Performs 24/7 system maintenance and administration service;
- Performs software development for data processing, display, interaction, and product generation; and,
- Monitors the creation of all products in the NCEP production suite on a 24/7 basis.

Advanced Weather Interactive Processing System (AWIPS) is the information processing, display, and telecommunications system that is the cornerstone of NWS field operations. AWIPS provides the following services:

- Integrates and displays observing data (meteorological, hydrological, satellite, and radar) at NWS field offices;
- Processes and displays forecast data at operational sites;
- Provides an interactive communications system including the Satellite Broadcast Network to connect NWS field locations and allows a mechanism for external partners to access the data;
- Initiates the dissemination of weather and flood warnings and forecasts in a rapid and highly reliable manner; and,
- Provides the communication interface for the public to see NOAA's data.

Hydrology Information Technology Initiatives gather, integrate and utilize advanced and localized water and related observations to predict streamflow and produce water resources information to inform decisions, which optimize water use and mitigate the impacts of floods and droughts.

- The Advanced Hydrologic Prediction System (AHPS) is a web-based suite of graphical river-forecast products that provide advanced information on the magnitude and likelihood of floods and droughts. Advanced river forecast information is provided at 4,011 locations throughout the United States to enable government agencies, private institutions, and individuals to make more informed decisions about risk-based policies and actions to mitigate the dangers posed by floods and droughts. This advanced forecast information includes uncertainty information generated by the Hydrologic Ensemble Forecast Service.
- Community Hydrologic Prediction System (CHPS) is the information technology infrastructure that all 13 RFCs use to develop and run operational hydrologic forecast models. This infrastructure generates data and information that water resource

managers and emergency managers use to effectively respond to flooding events.

National Centers and Regional IT Infrastructure maintain the information technology infrastructure and standards that enable the National Centers and regional offices, including forecast offices, to effectively work together. This includes:

- Computing that occurs outside of AWIPS;
- Local area networking;
- Security; and
- Data center power and cooling.

Without the continued support for NCEP, NCO, AWIPS, Hydrology Information Technology Initiatives, and National Centers and Regional IT Infrastructure, provided for in Central Processing ORF, NWS cannot continue to support the information technology necessary to process weather data and run weather models in support of national centers and field operations. These include not only the systems and initiatives outlined above, but also the WCOSS, AHPS, and other hydrology information technology initiatives.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Central Processing	Pos./BA	224	102,069	224	102,569	0	500
	FTE/OBL	221	102,069	221	102,569	0	500

Operationalize Flood Inundation Mapping (+$500, 0 FTE/ 0 Positions) – NOAA proposes a request to provide essential software engineering and IT contract support for establishing and scaling data services for national implementation of flood inundation mapping (FIM). Successful development and dissemination of nationwide FIM requires coordination among three NWS portfolios. The total request for this initiative is $5.0 million, to also include $3.75 million in Dissemination [NWS-107] and $0.75 million in Analyze, Forecast, and Support [NWS-65].

In the U.S., floods account for more loss of life and property than any other type of severe weather related event. To mitigate flooding impacts to the U.S. population and economy, this initiative will operationalize a FIM capability nationwide. Flood inundation maps provide an event-based graphical depiction of forecasted flood waters in real-time. This effort improves service equity by expanding FIM services from 110 thousand to over 3.4 million river miles across the entire country.

FIM capability has been successfully demonstrated in Texas and the northeast U.S. as part of NOAA's only DOC Agency Priority Goals. This initiative will enable the NWS to complete the development, operational implementation, and distribution of FIMs nationwide, which addresses a long-standing critical need of the public safety and emergency management community at all government levels. Moreover, this capability revolutionizes short-range planning and response to high impact flooding events for every community across the United States to help mitigate the human toll and infrastructure impacts.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

'Schedules and Milestones', 'Deliverables', and 'Performance Measures' reflect the outcomes resulting from all three NWS program increases given the non-severability of these initiatives.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022 – FY 2026

- Award contracts to support development of FIM datasets
- Operationalize dissemination pathways in conjunction with the availability of FIM by area

Deliverables:

- Develop the capability to routinely generate and disseminate operational real-time FIM for the full domain of the National Water Model
- Software to seamlessly process National Water Model outputs to be disseminated via the hybrid-cloud infrastructure through FIM GIS framework

Performance Measures:	2022	2023	2024	2025	2026
Percentage of the continental U.S. population served by operational FIM services					
With Increase	0%	10%	30%	60%	100%
Without Increase	0%	0%	0%	0%	0%

Outyear Costs:					
Direct Obligations	750	750	750	750	750
Capitalized	0	0	0	0	0
Uncapitalized	750	750	750	750	750

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Budget Authority	750	750	750	750	750
Outlays	465	465	465	465	465
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligation amounts in thousands)

Activity: Central Processing
Subactivity: Central Processing

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	27,671	28,065	29,032	29,032	0
11.3	Other than full-time permanent	78	81	82	82	0
11.5	Other personnel compensation	827	845	865	865	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	28,576	28,991	29,979	29,979	0
12	Civilian personnel benefits	10,646	11,053	12,302	12,302	0
13	Benefits for former personnel	17	18	20	20	0
21	Travel and transportation of persons	224	228	232	232	0
22	Transportation of things	128	120	125	125	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	3,065	3,456	3,463	3,463	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	451	483	490	490	0
24	Printing and reproduction	8	10	10	10	0
25.1	Advisory and assistance services	7,095	6,969	7,159	7,659	500
25.2	Other services from non-Federal sources	28,516	27,688	30,014	30,014	0
25.3	Other goods and services from Federal sources	598	599	612	612	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	12,004	11,613	11,969	11,969	0
31	Equipment	5,729	5,429	5,621	5,621	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	62	68	68	68	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	4	4	4	4	0
44	Refunds	0	0	0	0	0
99	Total obligations	97,124	96,727	102,069	102,569	500

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Central Processing	Pos./BA	224	102,069	224	102,819	0	750
	FTE/OBL	221	102,069	221	102,819	0	750

Seamless Weather to Climate Fire Weather Predictions to Improve Resilience and Disaster Mitigation (+$750, 0 FTE/ 0 Positions) – This request provides operational computing, storage, and associated technical support as part of a broader NOAA effort to develop and implement a comprehensive, integrated, seamless suite of prediction and impact-based decision support services (IDSS) tools for fire weather on timescales from hours to sub-seasonal and spatial scales from local to national. The total NWS request for this initiative is $4.0 million, to include $0.75 million in Central Processing, $0.5 million in the Analyze, Forecast, and Support request [NWS-69], $0.75 million in the Dissemination request [NWS-116], and $2.0 million in the Science and Technology Integration request [NWS-152].

Losses from wildfires over the last decade resulted in over $5 billion in damage, with new records set in the 2020 fire season. Annually, wildfires kill 30 people and destroy over 2,800 homes. Furthermore, non-local air quality and health impacts from wildfires are felt across the nation due to the advection of smoke and emissions. This project aims to reduce the devastating impacts of future wildfires by providing NWS Incident Meteorologists (IMETs), state and local fire control, the US Forest Service, and other federal agencies with IDSS tools to prevent and fight increased wildfire activity. The goal of the project is to provide wildland fire managers with more accurate predictions at longer lead times; predictions that will include robust uncertainty estimates and cascading information to allow nuanced high-tempo decisions during fire weather events thereby increasing their ability to effectively plan for and respond to wildfires.

Since weather conditions impact how fires start and how they move, this project will result in improved IDSS through the use of innovative science and technology improvements, including the development and use of probabilistic model ensembles, in better interpreting meteorological conditions, assessing their effects, and communicating that information to fire crews and incident command teams. These tools will enable continuous support for the duration of fire weather incidents, providing IMETs and incident command teams with scenarios for which fires will move and evolve for the duration of an event, therefore preventing loss of life and

property. NOAA will establish a new NOAA Fire Weather Testbed, facilitating close coordination between NWS, U.S. Forest Service, other federal agencies, state, tribal and local fire control, emergency managers, and other NOAA Line Offices.

With this funding, NWS will enhance the fire weather warning program through improved methods for predicting extreme fire danger, including use of probabilistic guidance and better messaging of IDSS. NWS will invest in a robust suite of fire weather numerical model post processing including specialized probabilistic fire weather guidance to improve NWS fire weather forecasts, warnings and impact-based decision support services. The NWS will focus improvements in numerical model forecasts of fire weather critical conditions, including the effects of complex terrain, in coordination with the Unified Forecast System (UFS) and Earth Prediction Innovation Center (EPIC). Probabilistic prediction of fire weather conditions will be incorporated into UFS numerical models focusing on both local (RRFS) and national (GEFS) scales, beginning with improving NWS objective measures of success for fire weather that will translate into improved services for society including underserved and vulnerable populations. NWS will also strengthen research-to-operations partnerships with both NOAA's OAR, university researchers, and the broader inter-agency fire weather community through effective fire weather focused testbed engagements.

The critical success index, also known as the threat score, will be used to measure the effectiveness of the proposed IDSS tools and improvements made as a result of the resources investment in the two-day fire weather forecast. It is the verification measure used for forecast performance, equal to the correct event forecasts divided by the total number of forecasts and the number of misses. Through this measure, NWS will communicate the two-day fire weather forecast and probabilistic IDSS tool improvements, which support continuous support to IMETs and incident command teams for the duration of fire events in saving lives and property.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

'Schedules and Milestones', 'Deliverables', and 'Performance Measures' reflect the outcomes resulting from all four NWS program increases given the non-severability of these initiatives.

Schedule and Milestones:

FY 2022 – FY 2026

- Leverage the NOAA Fire Weather testbed to demonstrate three new fire weather forecast and warning capabilities through Testbed experiments with participants from researchers, developers, forecasters, the inter-agency fire community, and end-users

- Conduct fire weather testbed experiments on evaluation of probabilistic guidance and messaging to improve IDSS
- Transition of at least one new or enhanced fire weather capabilities into NWS operations annually
- Implement innovative post processing methodologies to translate specialized probabilistic fire weather guidance into effective risk communication

FY 2022

- Work with SBES experts to survey fire partners and underserved communities to identify needed fire weather service improvements, and focus testbed developmental efforts
- Provide improved nationally consistent, hourly updating probabilistic lightning guidance that will be implemented through the incorporation of hourly high resolution, fine scale numerical model (HRRR or RRFS) guidance within existing NWS NBM lightning guidance
- Develop new fire weather focused metrics to measure and focus national and regional scale UFS numerical forecast improvement

FY 2023

- Provide improved nationally consistent probabilistic lightning density guidance from Day 1 through Day 2 in support of local and national impact-based decision support services requirements
- Implement new fire weather focused metrics to measure and focus national and regional scale UFS numerical forecast improvement and guide year-over-year UFS improvements to national fire weather services
- Implement annual NWS National Blend of Model (NBM) guidance with improvements focused to support improved national fire weather services

FY 2024

- Develop best practices to ensure effective use of next-generation mesoscale analysis system to enable enhanced IDSS communication of the onset of critical and extreme fire weather conditions
- Implement annual upgrade of NWS National Blend of Model (NBM) guidance with improvements focused to support improved national fire weather services.
- Develop and implement new fire weather focused metrics for local scales to measure and focus very high resolution UFS numerical forecast improvement

FY 2025

- Implement annual NWS National Blend of Model (NBM) guidance with improvements focused to support improved national fire weather services
- Implement additional fire weather focused metrics for local scales to measure and focus local very high resolution UFS numerical forecast improvement and guide year-over-year UFS improvements to nationwide fire weather services

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

- Share best practices to ensure effective use of next-generation mesoscale analysis system to enable enhanced IDSS communication of the onset of critical and extreme fire weather conditions
- Evaluation of existing methods to predict conditions supportive of extreme fire danger, fire ignition events, and fire behavior

FY 2026

- Provide improved high resolution guidance on terrain influenced extreme fire weather conditions to support short-range wildfire decision making
- Refine best practices to ensure effective use of next-generation mesoscale analysis system to enable enhanced IDSS communication of the onset of critical and extreme fire weather conditions
- Continue the development and implementation of refined fire weather focused metrics for local scales to measure and focus local very high resolution UFS numerical forecast improvement and guide year-over-year UFS improvements to nationwide fire weather services

Deliverables:

- Post processing techniques for translation of specialized probabilistic fire weather guidance into effective risk estimates
- Improved next generation, nationally consistent NWS fire weather services, that exploit improved UFS numerical models, which is optimized to support fire community and diverse societal needs and critical decision support requirements

Performance Measures	2022	2023	2024	2025	2026
National Fire Weather Two-Day Forecast Accuracy (Critical Success Index)					
With Increase	0.35	0.35	0.40	0.40	0.45
Without Increase	0.35	0.35	0.35	0.35	0.35

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Outyear Costs:					
Direct Obligations	750	750	750	750	750
Capitalized	750	750	750	750	750
Uncapitalized	0	0	0	0	0
Budget Authority	750	750	750	750	750
Outlays	465	465	465	465	465
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Central Processing
Subactivity: Central Processing

Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
Full-time permanent compensation	27,671	28,065	29,032	29,032	0
Other than full-time permanent	78	81	82	82	0
Other personnel compensation	827	845	865	865	0
NOAA Corps	0	0	0	0	0
Special personnel services payments	0	0	0	0	0
Total personnel compensation	28,576	28,991	29,979	29,979	0
Civilian personnel benefits	10,646	11,053	12,302	12,302	0
Benefits for former personnel	17	18	20	20	0
Travel and transportation of persons	224	228	232	232	0
Transportation of things	128	120	125	125	0
Rent, communications, and utilitites	0	0	0	0	0
Rental payments to GSA	3,065	3,456	3,463	3,463	0
Rental Payments to others	0	0	0	0	0
Communications, utilities and misc charges	451	483	490	490	0
Printing and reproduction	8	10	10	10	0
Advisory and assistance services	7,095	6,969	7,159	7,159	0
Other services from non-Federal sources	28,516	27,688	30,014	30,364	350
Other goods and services from Federal sources	598	599	612	612	0
Operation and maintenance of facilities	0	0	0	0	0
Research and development contracts	0	0	0	0	0
Medical care	0	0	0	0	0
Operation and maintenance of equipment	0	0	0	0	0
Subsistence and support of persons	0	0	0	0	0
Supplies and materials	12,004	11,613	11,969	11,969	0
Equipment	5,729	5,429	5,621	6,021	400
Lands and structures	0	0	0	0	0
Investments and loans	0	0	0	0	0
Grants, subsidies and contributions	62	68	68	68	0
Insurance claims and indemnities	0	0	0	0	0
Interest and dividends	4	4	4	4	0
Refunds	0	0	0	0	0
Total obligations	97,124	96,727	102,069	102,819	750

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Central Processing	Pos./BA	224	102,069	224	102,969	0	900
	FTE/OBL	221	102,069	221	102,969	0	900

Co-Development of Sub-Seasonal to Seasonal (S2S) Decision Support Services to Mitigate the Impacts of Extreme Events and Enable a Resilient Society (+$900, 0 FTE/ 0 Positions) – This increase will expand existing computational capacity to support this initiative. For example, extended periods of significantly below normal temperatures can adversely impact crop planting and harvesting schedules. NWS proposes to provide improved delivery of new publicly available products and services which will better provide information to vulnerable and underserved communities. NOAA requests a total $5.3 million to develop S2S (week two to three months) decision support services (DSS) for long lead time extreme events that occur on a timeframe from weeks to months. This initiative also includes $0.4 million for improved delivery of new products and services for Dissemination [NWS-122], $0.5 million for user engagement surveys and workshops in the Analyze, Forecast, and Support [NWS-76], and $3.5 million for Science and Technology Integration in support of DSS product/service development and training and outreach [NWS-159].

Understanding and predicting extreme events on the subseasonal to seasonal time scale and their impacts has been identified in the *Weather Research and Forecasting Innovation Act of 2017* (P.L. 115-25) and the *National Integrated Drought Information System Reauthorization Act of 2018* (P.L. 115-423) as a top national priority. Decision makers are often faced with a complex array of information including intertwining tasks required to design mitigation strategies for developing responses to high impact environmental events amid greater uncertainty, which is exacerbated by climate change.

NOAA will leverage social science to engage stakeholders across multiple sectors (e.g., agricultural, water resources, public health, emergency management, marine resources, and energy sectors), including decision makers in underserved communities such as Tribal governments, inner-city communities, economically disadvantaged rural regions, and other vulnerable populations, in the development of requirements for S2S DSS actionable data/services. Following the iterative engagement with stakeholders and end users to understand user requirements, NWS will engage with Weather/Water/Climate Enterprise partners in assessing how best to use Enterprise capabilities to meet these requirements. For those areas where NOAA services can best meet user needs, NWS in

partnership with OAR, will develop specific DSS data/services that meet the requirements identified. As a result, NWS will be better equipped to provide DSS data/services, training and outreach to maximize usability and actionable information in the user communities, and provide a more comprehensive suite of early warning information for enhanced decision-making for stakeholders. This will lead to increased resilience and improved mitigation planning to be better prepared for extreme events such as excessive heat and cold waves, extreme winds, droughts, floods, severe storms, winter storms, and tropical cyclones/hurricanes.

The proposed DSS will provide probabilistic information on the likelihood of extreme S2S climate events and use state of the science methods including ensemble post-processing of dynamical models, artificial intelligence/machine learning (AI/ML) tools, and statistical techniques and hybrid combinations of these different approaches. The products/services will be user-friendly, provide historical skill and confidence levels in line with the “deep uncertainty” associated with the use of extended predictions for decision making, and support a broad level of guidance products across different sectors (agriculture, water-resources, public health, emergency management, marine-resources and energy). These data/services will allow users to objectively include sub-seasonal to seasonal climate prediction information as part of their decision-making processes, thereby enhancing user preparedness, planning, and resilience. The specific number and type of data/services developed will depend upon results of research on predictive skill limits and social science data gathering. Finally, we will utilize social science to evaluate the impact of these data/services to inform the refinement of the existing data/services and development of data/services.

NOAA’s cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

‘Schedules and Milestones’, ‘Deliverables’, and ‘Performance Measures’ reflect the outcomes resulting from all four NWS program increases given the non-severability of these initiatives.

Schedule and Milestones:
FY 2022 – FY 2026

- FY 2022
    - Stakeholder meetings conducted to understand key climate-based impact decisions and how S2S information can inform those decisions

    - NOAA and Weather Water Climate Enterprise interactions to assess capabilities/roles in meeting user needs
    - NWS and NOAA labs begin product/service development based on user needs
- FY 2023
    - Prototype sectoral specific decision support service co-developed and tested with stakeholders
- FY 2024
    - Evaluation of prototype sectoral specific decision support services
    - Operationalization of 4 prototype DSS data/services
- FY 2025
    - Stakeholder meetings conducted to scope improvements to first-generation data/services supporting sectoral specific decision-making
    - NWS and NOAA labs begin work on second generation DSS data/services. Operationalization of 4 additional prototype DSS data/services
- FY 2026
    - Co-development and testing of second generation sectoral specific decision support services

Deliverables:

- Documentation of user needs for sectoral specific DSS
- Plan for providing DSS to underserved user communities developed and executed
- Operational DSS tools for agriculture, water resources, public health, emergency management, marine resources, and energy communities
- Objectively evaluated predictive skill limits and confidence levels for sub-seasonal to seasonal extreme climate events including heat and cold waves, droughts, floods, severe and fire weather, ocean heat waves, and tropical cyclones/hurricanes
- Evaluation of the impact of sectoral specific DSS

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of Sectoral-Specific DSS (cumulative)					
With Increase	0	0	4	4	8
Without Increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	900	900	900	900	900
Capitalized	900	900	900	900	900
Uncapitalized	0	0	0	0	0
Budget Authority	900	900	900	900	900
Outlays	558	558	558	558	558
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Central Processing
Subactivity: Central Processing

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	27,671	28,065	29,032	29,032	0
11.3	Other than full-time permanent	78	81	82	82	0
11.5	Other personnel compensation	827	845	865	865	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	28,576	28,991	29,979	29,979	0
12	Civilian personnel benefits	10,646	11,053	12,302	12,302	0
13	Benefits for former personnel	17	18	20	20	0
21	Travel and transportation of persons	224	228	232	232	0
22	Transportation of things	128	120	125	125	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	3,065	3,456	3,463	3,463	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	451	483	490	490	0
24	Printing and reproduction	8	10	10	10	0
25.1	Advisory and assistance services	7,095	6,969	7,159	7,159	0
25.2	Other services from non-Federal sources	28,516	27,688	30,014	30,914	900
25.3	Other goods and services from Federal sources	598	599	612	612	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	12,004	11,613	11,969	11,969	0
31	Equipment	5,729	5,429	5,621	5,621	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	62	68	68	68	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	4	4	4	4	0
44	Refunds	0	0	0	0	0
99	Total obligations	97,124	96,727	102,069	102,969	900

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Central Processing	Pos./BA	224	102,069	224	104,069	0	2,000
	FTE/OBL	221	102,069	221	104,069	0	2,000

Expand and Enhance NWS Services to Vulnerable/Underserved Communities for Extreme Events: Improve Service Delivery (+$2,000, 0 FTE/ 0 Positions) – NOAA requests an increase to improve service delivery to underserved communities. The total NWS request for this initiative is $3.0 million, to include $1.0 million in Analyze, Forecast and Support [NWS-81]. This request proposes to increase availability of NWS products by translating them to the Spanish language for preparedness information and high-impact extreme events.

Today, NWS products are not uniformly translated to Spanish, creating a gap in NWS' ability to conduct its mission for all stakeholders. Currently, there are numerous locally developed capabilities to automate language translation which are not scalable to a larger enterprise implementation. A subset of the more critical extreme event products are manually translated into Spanish which is extremely labor intensive and not sustainable to operate. Further complicating this challenge are the multiple, distinct Spanish dialects and localized meteorological phenomenon that need to be incorporated and considered at the local office level.

With this funding, Central Processing (CP) will develop and incrementally implement a sustainable and scalable Spanish language translation approach which will integrate with existing enterprise systems NWS-wide. CP will automate the translation of the Atlantic basin products from the National Hurricane Center by leveraging automated artificial intelligence (AI) followed by the translation of key products at NWS Weather Forecast Offices prioritized with the largest percentage of Spanish speaking populations. Additional offices will incorporate this capability as training of AI models and associated quality control of translated products are developed to address unique dialects of the local population. Also, CP will lay the groundwork to scale automated translations to additional languages in support of other Limited English Proficient populations.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations

for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

Schedule and Milestones:
FY 2022 – FY 2026

- Define technical architecture for integrating language translation in existing NWS enterprise applications
- Identify NWS Offices with largest percentage of Spanish speaking population to prioritize translation of key products
- Social science recommendations for Spanish translation and comprehension incorporated into translation system requirements and overrides
- Automated AI translation of nationally disseminated free-text products for high-impact events produced by NWS National Centers such as the National Hurricane Center and Storm Prediction Center
- Grid-based text formatters developed for Spanish translation of local WFO forecasts and deployed at offices with the greatest need for Spanish products

Deliverables:

- NWS products translated to Spanish language more widely available to Limited English Proficient populations for preparedness information and high-impact extreme events

Performance Measures	2022	2023	2024	2025	2026
Number of NWS Offices with Spanish Translation Available Online					
With Increase	2	8	24	40	56
Without Increase	1	2	5	7	7

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Outyear Costs:					
Direct Obligations	2,000	2,000	2,000	2,000	2,000
Capitalized	2,000	2,000	2,000	2,000	2,000
Uncapitalized	0	0	0	0	0
Budget Authority	2,000	2,000	2,000	2,000	2,000
Outlays	1,240	1,240	1,240	1,240	1,240
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Central Processing
Subactivity: Central Processing

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	27,671	28,065	29,032	29,032	0
11.3	Other than full-time permanent	78	81	82	82	0
11.5	Other personnel compensation	827	845	865	865	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	28,576	28,991	29,979	29,979	0
12	Civilian personnel benefits	10,646	11,053	12,302	12,302	0
13	Benefits for former personnel	17	18	20	20	0
21	Travel and transportation of persons	224	228	232	232	0
22	Transportation of things	128	120	125	125	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	3,065	3,456	3,463	3,463	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	451	483	490	490	0
24	Printing and reproduction	8	10	10	10	0
25.1	Advisory and assistance services	7,095	6,969	7,159	7,159	0
25.2	Other services from non-Federal sources	28,516	27,688	30,014	32,014	2,000
25.3	Other goods and services from Federal sources	598	599	612	612	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	12,004	11,613	11,969	11,969	0
31	Equipment	5,729	5,429	5,621	5,621	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	62	68	68	68	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	4	4	4	4	0
44	Refunds	0	0	0	0	0
99	Total obligations	97,124	96,727	102,069	104,069	2,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Central Processing	Pos./BA	224	102,069	224	103,069	0	1,000
	FTE/OBL	221	102,069	221	103,069	0	1,000

Space Weather Research to Operations (+$1,000, 0 FTE/ 0 Positions) – With this increase, NOAA will support the Space Weather Prediction Testbed and co-locate it with the Space Weather Prediction Center (SWPC) in Boulder, Colorado, as a key component of a formal research-to-operations/operations-to-research (R2O2R) mechanism. Specifically, this increase will provide essential IT contract support and production analysis contract support through the National Centers for Environmental Prediction Central Operations. The total NWS request for this initiative is $5.0 million, also including $4.0 million in Science and Technology Integration [NWS-165].

Space weather can disrupt the technology that forms the backbone of this country's economic vitality and national security, including satellite and airline operations, communications networks, navigation systems, and the electric power grid. A recent study (ABT - 2017[2]) indicated upwards of a $20 billion impact to just a single electric power market experiencing a nine-hour outage due to an extreme space weather event. More widespread or prolonged events will result in more significant economic impacts.

Current space weather services do not meet the needs of operators of critical infrastructure. The absence of a formal framework for sustaining and transitioning models and observational capabilities from R2O2R was identified by the Space Weather Operations, Research, and Mitigation (SWORM) Interagency Working Group (consisting of 34 Federal departments and agencies) as a critical gap in our Nation's ability to improve existing space weather services. To close the gap, the *PROSWIFT Act* (P. L. 116-181) directs federal agencies to develop formal mechanisms to transition space weather research models and capabilities to NOAA.

The transition of research into the NOAA/NWS operational forecast-watch-warning paradigm will ensure the Nation capitalizes on the hundreds of millions of dollars in research investments. Developing the Testbed will ultimately make space weather prediction

[2] Written under contract for the NOAA National Weather Service by Abt Associates, *Social and Economic Impacts of Space Weather in the United States*, September 2017.

equivalent to terrestrial weather forecasts, watches, and warnings to ensure the Nation and communities worldwide are ready for and responsive to space-weather events with potentially global impacts.

The development of a space weather testbed will bring together space weather decision-makers, researchers (including social, behavioral, and decision science), developers, and operational forecasters working side-by-side to improve and tailor products that will provide the necessary actionable information for space weather planning and execution. SWPC will work with National Aeronautics and Space Administration (NASA), National Science Foundation (NSF), and Department of Defense through a signed Memorandum of Understanding to accelerate numerical model advances supported by NASA and NSF to NOAA operations. Additionally, the Testbed will sponsor visiting scientists and end-user decision-makers from partnering agencies, academia, the commercial enterprise, and international partners to participate in collaborative evaluations and experiments. These exchanges will also include short-term invitational travel and longer-term personnel exchanges between agencies.

Space weather events can have far-reaching impacts on our Nation's economy, communications, and national security. This request will increase NOAA's ability to forecast these events by increasing research-to-operations-to-research capabilities.

'Schedules and Milestones,' 'Deliverables,' and 'Performance Measures' reflect the outcomes resulting from both NWS program increases given the non-severability of these initiatives.

Schedule and Milestones:

FY 2022 – FY 2023
- Construction of a Space Weather Prediction Testbed facility

FY 2024
- Validation and demonstration of three new space weather prediction capabilities during Testbed experiments incorporate participation from researchers, developers, forecasters, the commercial sector, and end-users

FY 2024- FY 2026
- The transition of at least two new or enhanced capabilities into NWS operations annually

Deliverables:

- An NWS space weather R2O2R capability better incorporates space weather research advances from the NSF, NASA, and the Department of Defense into the NOAA operational forecasting systems at the NOAA/NWS SWPC

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

- Improved NWS's forecasts, watches, and warnings that safeguard society by mitigating the impact of space weather events

Performance Measures	2022	2023	2024	2025	2026
Number of new or enhanced space weather capabilities transitioned to operations (cumulative)					
With Increase	2	4	6	8	10
Without Increase	1	1	2	2	3
Outyear Costs:					
Direct Obligations	1,000	1,000	1,000	1,000	1,000
Capitalized	300	300	300	300	300
Uncapitalized	700	700	700	700	700
Budget Authority	1,000	1,000	1,000	1,000	1,000
Outlays	620	620	620	620	620
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Central Processing
Subactivity: Central Processing

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	27,671	28,065	29,032	29,032	0
11.3	Other than full-time permanent	78	81	82	82	0
11.5	Other personnel compensation	827	845	865	865	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	28,576	28,991	29,979	29,979	0
12	Civilian personnel benefits	10,646	11,053	12,302	12,302	0
13	Benefits for former personnel	17	18	20	20	0
21	Travel and transportation of persons	224	228	232	232	0
22	Transportation of things	128	120	125	125	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	3,065	3,456	3,463	3,463	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	451	483	490	490	0
24	Printing and reproduction	8	10	10	10	0
25.1	Advisory and assistance services	7,095	6,969	7,159	7,659	500
25.2	Other services from non-Federal sources	28,516	27,688	30,014	30,214	200
25.3	Other goods and services from Federal sources	598	599	612	612	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	12,004	11,613	11,969	11,969	0
31	Equipment	5,729	5,429	5,621	5,921	300
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	62	68	68	68	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	4	4	4	4	0
44	Refunds	0	0	0	0	0
99	Total obligations	97,124	96,727	102,069	103,069	1,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Analyze, Forecast and Support
Subactivity: Analyze, Forecast and Support

Goal Statement

NWS' mission is to provide forecasts and warnings for the protection of life and property, and to support the national economy. The Analyze, Forecast and Support (AFS) Activity leverages innovations from the Science and Technology Integration (STI) Activity, and utilizes output and support services from the Observations, Central Processing, and Dissemination Activities by applying expertise to the observed data, model outputs, and dissemination systems, resulting in forecasts, warnings, and Impact-based Decision Support Services (IDSS) for the Nation in support of the Department of Commerce 2018-2022 Strategic Plan, Strategic Objective 3.3 Reduce Extreme Weather Impacts.

Base Program

NWS' distributed network of forecast offices, specialized centers, and associated workforce of meteorologists, hydrologists, climatologists, and space physicists is supported through the AFS Activity. This expert workforce monitors the weather, water, climate and space weather from our oceans to the surface of the sun, 24 hours a day, seven days a week. These professionals provide information using a collaborative forecast process that enables forecasts and warnings to benefit from the NWS' fully integrated forecast process. Forecasts globally support agriculture, transportation, energy production and water management among other missions and industries. Forecasts and warnings, provided days in advance of pending winter storms or hurricanes, wildland fire conditions, tornado outbreaks, heat waves or river floods, enable the public, industry, and emergency managers to plan effective preparation and response strategies. Warnings for high impact, rapidly evolving hazards such as solar storms, tornadoes, tsunamis, flash floods or ash plumes following volcanic eruptions, enable decision makers to keep the public out of harm's way to protect their lives and livelihoods.

NOAA's network of Weather Forecast Offices (WFOs), River Forecast Centers (RFCs), and specialized national centers house the NOAA equipment and expertise that results in weather forecasts, warnings, and the provision of IDSS. Like any other physical asset, this infrastructure must be maintained to support NWS' mission delivery and efforts to build a Weather-Ready Nation. Many of these facilities are required to operate 24 hours per day, 365 days per year. As such, NWS conducts facility condition assessments (FCAs) for all leased and owned facilities. At many locations, the FCA identifies issues that significantly affect operational readiness, service delivery, or occupant safety. A first assessment of all facilities was completed in FY 2019, and NWS now has a comprehensive analysis of site conditions, itemized deferred maintenance requirements and costs, and the 10 year projected life cycle cost for all

NWS locations. The FCA process continued in FY 2020 and began the cycle to update all of our facility assessments. However, the FCAs were paused during the pandemic, although work to address identified deferred maintenance continued. NWS made significant facility deferred maintenance and capital improvement investments in FY 2019 and 2020.

Statement of Operating Objectives

Schedule and Milestones:
FY 2022 – FY 2026

- Operate national network of 24/7 WFOs, that provide weather surveillance, IDSS, forecast and warning services
- Operate national network of RFCs that provide river stage, streamflow, water supply, and flood guidance
- Operate the National Centers for Environmental Prediction (NCEP) service centers that monitor the tropics, high seas, and national airspace, warn of space weather hazards, predict tornadoes, provide outlooks for subseasonal and seasonal conditions and develop and deliver foundational data sets
- Operate the National Water Center (NWC) to support water resource decision making across the Nation
- Operate NOAA's component of the interagency U.S. National Ice Center (USNIC) to support sea ice analysis and prediction
- Provide IDSS to core partners during routine and high impact events
- Operate Tsunami Warning Centers to monitor and predict the development and onset of tsunamis along the Nation's coasts and coasts of other countries as agreed by treaty
- Provide weather and financial support to the Nations of the Pacific Island Compact

Deliverables:

- Operations of all WFOs, RFCs, National Centers, and Tsunami Warning Centers
- IDSS provided to local, regional and state partners and decision makers from WFOs, RFCs and National Centers
- Provision of field operational support from National Headquarters
- Operations and maintenance of Weather Service Offices (WSO) outside the continental United States that support the Nations of the Pacific Island Compact
- Operations and maintenance of WSOs and Data Collection Offices in Hawaii and Alaska as components of the national observation program
- Improved hydrologic predictions, subseasonal and seasonal outlooks, forecasts of space weather conditions, and forecasts of hurricanes, blizzards, heat waves, tsunamis, and severe storms
- Operational sea ice forecasts from the USNIC

- Aviation weather forecasts for all identified airports and air routes
- Deployments of Incident Meteorologists (IMETs) to support decision makers at wildland fires
- Continued support of StormReady® communities
- Street-level water information for every stream reach in the continental United States, at 2.7 million locations
- A predictive 1-hr-to-10-day national water forecast for the entire Nation
- A 30-day water outlook for the entire Nation (excluding storm influences)
- Flood forecast inundation maps for communities across the Nation

Explanation and Justification

		2020 Actual		2021 Enacted		2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Analyze, Forecast & Support	Pos/BA	2,870	517,419	2,930	536,872	2,929	559,719
	FTE/OBL	2,842	528,184	2,899	536,872	2,898	559,719

NWS issues forecasts and warnings, provides seasonal outlooks, and communicates the effects of changing weather, sub-seasonal to seasonal climate trends, and water resources information to the American public and to the weather/water/climate enterprise. Weather and water impact every sector of the economy, and businesses rely on NOAA's information to improve commerce. Timely and accurate warnings for weather and water-related hazards – provided reliably and on time, every time – are necessary for public safety. NWS measures satisfaction with NOAA information and warning services through surveys of emergency managers, first responders, natural resource and water managers, public health professionals, industry, government, and the public. NWS then uses these results to inform service improvements.

In FY 2021, the National Water Center (NWC) continued its evolution from Initial Operating Capability toward Full Operating Capability as directed in the *Consolidated Appropriations Act, 2021* (P.L. 116-260). The NWC geographically expanded Flood Inundation Mapping (FIM), demonstrating the capability across the full domain of the Continental U.S. NWC activities also include facilitating collaboration within the NWS, across NOAA, and among Federal Water Agencies to improve water resources situational awareness and decision support services. These collaborative activities include the NOAA Annual Spring Outlook, which helps communities prepare for the potential for flooding from mid-March through June. NWC maintains situational awareness before,

during, and after all hydrologic events, and leads the agency/interagency coordination for significant national or multi-regional hydrologic events. Moreover, NWC works with NCEP Centers, Regional Operations Centers, RFCs, WFOs, and core Federal agency partners including U.S. Geological Survey (USGS), U.S. Army Corps of Engineers (USACE), and Federal Emergency Management Agency (FEMA) to maintain a common operating picture to ensure coordinated and actionable water resources decision support services that inform both routine, high value and event-driven, high impact decisions. NWC also implemented a first ever, centralized capability providing service backup and continuity of operations for NOAA's 13 RFCs.

Recognizing the gap in equitable water resources information, the NWS developed the concept of a continental domain, neighborhood scale water resources model to deliver service equity for communities nationwide. NOAA's National Water Model (NWM), introduced in August 2016 as the first foray in leveraging High Performance Computing for hydrology, is a continental-scale water resources model that combines data from USGS stream gauges, USACE and other partner reservoir release information with outputs from NOAA's atmospheric weather models to significantly improve the spatial resolution and temporal frequency of streamflow and flood forecasts. The NWM simulates conditions for 3.4 million miles of rivers and streams nationwide every hour, expanding from the 110K miles forecast today by RFCs. The model also improves NOAA's ability to meet the needs of stakeholders by providing more frequent and expanded streamflow information, as well as new forecast capabilities for soil moisture, evapotranspiration, runoff, snow water equivalent and other water resources parameters on a high resolution grid nationwide. The NWC leads improvements to national hydrologic forecasting through strong collaboration with the public, private, and academic sectors.

NWS continues to upgrade the NWM to expand the domain and serve additional U.S. populations. In FY 2021, NWS made specific improvements to expand the NWM domain to the Great Lakes and their contributing areas, as well as Puerto Rico and the U.S. Virgin Islands with the operational implementation of NWM version 2.1. The NWS has improved model performance downstream from reservoirs by incorporating real-time and projected releases into the NWM. The NWS has also incorporated new diagnostic capabilities and extended the retrospective analysis of the NWM back to 1979.

In May 2020, the NOAA component of the tri-agency USNIC was realigned from the National Environmental Satellite, Data, and Information Service (NESDIS) to NWS, into NCEP's Ocean Prediction Center (OPC), to enable NOAA to meet growing requirements for operational sea ice forecasting. Given USNIC's mission to produce global snow cover and sea ice products, this action aligns national and global scale operational weather analysis and prediction functions within NWS/NCEP. This realignment also leverages the organizational synergies within NCEP by combining USNIC's existing global sea ice analysis capability with hazardous marine weather forecasting at OPC and positions NWS to start planning implementation of a full spectrum of integrated analysis and

prediction of polar maritime weather and ice, including improved sea ice predictions and hazards, and polar seasonal outlooks

In FY 2020, NWS met or exceeded 12 of its 16 field-based Government Performance and Results Act goals. Also in FY 2020, NOAA's Space Weather Prediction Center became a Global Space Weather Center under the International Civil Aviation Organization.

AFS maintains the following programs to accomplish this and other mission critical activities:

Weather and Climate Services and Warnings provide real-time meteorological and subseasonal to seasonal climate products and services to emergency managers, public officials and the public. To achieve this requirement, NWS operates WFOs and other field offices within the continental United States, Alaska, Hawaii, U.S. territories and in locations within the Pacific Island Compact.

- WFOs issue warnings, watches, advisories, statements, and forecasts for their geographic area of responsibility at multiple time scales, from alerting for immediate threats, to subseasonal and seasonal reports. WFOs operate full time 24/7/365. WFO forecasts include aviation, fire weather, marine, severe and tropical weather and the prediction of winter storms. WFOs also issue warnings for tornadoes, blizzards, large hail, flash floods (including ice jams and dam failures) and projected tsunami impacts. WFOs control broadcasts of weather information on the NOAA Weather Radio All Hazards stations, provide weather spotter training to communities, and foster close ties with both the media and the emergency management community. Staff at WFOs have a close relationship with local, state, territorial and native American government officials and emergency managers and provide IDSS to support their decision making both remotely and at their operations centers during hazardous conditions.
- WSOs and Data Collection Offices (DCOs) are located within Alaska and Pacific Regions and provide a collection of expert hydro-meteorological data in support of local, regional, national, and global weather, hydrologic, climatic, and warning programs. WSOs support the mission of their associated WFO through public service, education, and outreach. They differ from WFOs in that they do not issue forecasts or warnings, are responsible primarily for observations and data collection, and are not operated 24 hours a day.
- Through an interagency agreement with the FAA, NWS forecasters are embedded within all 21 Air Route Traffic Control Centers (called Center Weather Service Units or CWSUs) to provide direct decision support services to air traffic managers promoting aviation safety and supporting efficient airspace management.

National Centers provide specialized forecast guidance and products for NWS field offices and other direct users (such as the FAA's Air Traffic Control System Command Center, and FEMA) through NCEP. Each National Center depends on data from the

Observations Subactivity, model output from the supercomputers in Central Processing, dissemination infrastructure from the Dissemination Subactivity, and innovations from the Science and Technology Integration Subactivity to provide expert analysis and prediction services to the local WFO and RFC infrastructure and other core partners. The National Centers provide an integrated suite of numerical weather and environmental forecast guidance, at scales ranging from local to global, at various time frames. National Centers also issue watches and warnings that include tornado watches, hurricane watches and warnings, gale, storm, and hurricane-force wind warnings for large oceanic storms, aviation weather warnings and advisories for hazards to aircraft, space weather alerts, and seasonal predictions for El Niño and La Niña events. NWS Forecasters and the weather enterprise use this information and the suite of weather model output as the basis for consistent forecast products, advisories and warnings. The AFS Subactivity supports seven NCEP National Centers:

- **Aviation Weather Center (AWC)** delivers consistent, timely and accurate weather information to support safe air navigation for the world airspace system. AWC provides aviation warnings and forecasts of hazardous flight conditions (including volcanic ash), at all levels within domestic and international airspace, and has an embedded group of forecasters at the FAA's Air Traffic Control System Command Center.

- **Climate Prediction Center (CPC)** delivers real-time products and information on timescales from weeks two-to-four to sub-seasonal and seasonal, integrating observed weather with longer-term climate variability. This includes predictions for the onset and duration of El Niño and La Niña events, which can have a significant impact on the nation's weather from the potential extremes of flood, drought, excessive heat or cold, and severe weather. Application of CPC services provides social and economic benefits to agriculture, energy, transportation, water resources, and public health. CPC works with scientific partners around the world to understand and predict modes of natural global climate variability.

- **National Hurricane Center (NHC)** issues watches, warnings, forecasts and analyses of hazardous tropical weather (e.g., tropical storms and hurricanes including storm surge), and offshore and high seas marine forecasts for a large part of the southwest North Atlantic (south of 30 degrees North), Caribbean Sea, Gulf of Mexico and the eastern North Pacific (east of 140 degrees West). NHC also leads a substantial education and outreach program on tropical hazards both domestically and internationally.

- **Ocean Prediction Center (OPC)** issues marine warnings, forecasts, and guidance for maritime users and continually monitors and analyzes maritime data for protection of life and property, safety at sea, and enhancement of economic opportunity. OPC issues gale, storm and hurricane-force wind warnings for the Atlantic and Pacific Oceans, north of 30

Degrees North. As part of OPC, NOAA's component of the interagency USNIC produces global snow cover and operational sea ice prediction products.

- **Space Weather Prediction Center (SWPC)** provides real-time monitoring and forecasting of solar and geophysical events and disturbances such as geomagnetic storms and solar flares. SWPC researchers and partners develop advanced models to improve understanding of the space weather environment and predict future events. Model improvements enable better prediction of these events and their potential impact on Earth. Impacts could include disruptions to satellite communications, impacts to the terrestrial electric grid and communication outages to cross polar airline flights. SWPC supports the Space Weather Operations, Research and Mitigation national space weather strategy and serves as an International Civil Aviation Organization Space Weather Center.

- **Storm Prediction Center (SPC)** provides forecasts and watches for tornadoes, severe thunderstorms, large hail, lightning, wildfire potential, and heavy precipitation for the United States.

- **Weather Prediction Center (WPC)** is responsible for preparing a variety of analyses, national guidance products, and reliable national forecasts through a collaborative forecast process that ensures consistency and accuracy. The WPC specializes in providing national temperature and quantitative precipitation forecasts and predictions of the impacts of winter storms.

Hydrologic Services and Warnings provides hydrologic data, analysis, forecast information, and decision support services through the National Water Center (NWC), RFCs, and WFOs to address the Nation's growing water resources challenges.

- RFCs provide short range (deterministic) and long range (probabilistic) river level and streamflow forecasts, flash flood guidance, and water supply forecasts. RFCs deliver a set of water resource-related decision support services for regional, state, and local NWS core partners that facilitate decision making associated with water supply planning and events ranging from flash floods to drought. A wide range of users depend on these forecasts including those in emergency management, agriculture, hydroelectric dam operation, transportation, recreation, and water resources management. The forecast information is the basis for river and flash flood warnings, watches, and advisories issued by the WFOs. NWS operates 13 RFCs.
- WFOs assess and monitor the threat of flash and river flooding 24 hours a day 7 days a week to provide timely and accurate life-saving forecasts, warnings and decision support services. In addition, WFOs work with dam operators and the emergency management community to provide timely warnings for floods that result from infrastructure failure such as dam break and

levee breaches. Moreover, WFOs routinely conduct local outreach and education to heighten public and partner awareness of flood risks and NWS hydrologic services. NWS operates 122 WFOs.

- The NWC acts as a catalyst for interagency activities as they relate to the transformation of NOAA's water prediction capabilities and decision support services. Moreover, it serves as an operational forecasting center, which includes a FEMA Liaison Officer. To that end, NWC maintains situational awareness before, during, and after all hydrologic events, from floods to drought, and leads the agency/interagency coordination for significant national or multi-regional hydrologic events. The goal is to establish an integrated and common operating picture for water resources. Moreover, the NWC is focused on developing and improving new national water prediction capabilities such as the National Water Model, which simulates conditions for 3.4 million miles of rivers and streams nationwide every hour. A second new transformational hydrologic forecasting capability is the Hydrologic Ensemble Forecasting Service (HEFS), which produces reliable and skillful ensemble streamflow forecasts at lead times ranging from one hour to one year. HEFS is particularly useful for long-range water resource planning and risk-based water resources decision-making.

NOAA's Tsunami Warning Program provides reliable, 24/7 monitoring of seismic events that could generate a tsunami that could impact the Atlantic or Pacific coastlines. In the event of a tsunami, the program generates timely and precise warnings, predictions of wave impact times and heights, and operational tools for emergency managers and public officials to guide rapid, critical decisions in which lives and property are at stake. The program uses DART® moorings from the observations program as critical input and verification of tsunami forecasts.

Tsunami forecast modeling research seeks to develop faster and more reliable tsunami forecasts. Inundation modeling assists communities with their efforts to assess risk and mitigate potential impacts.

Tsunami hazard mitigation grants have enabled partner states to support coastal communities with life-saving products and services such as coastal inundation maps, evacuation plans and maps, preparedness training and mitigation workshops, evacuation drills, warning infrastructure (e.g., sirens), and tsunami evacuation signs.

The program coordinates with a variety of national and international partners and is supported by the Pacific Tsunami Warning Center (PTWC) in Hawaii and the National Tsunami Warning Center (NTWC) in Alaska. Ongoing work in the Tsunami Warning Program includes

- performing innovative research to speed earthquake detection and improve the reliability of predictions of tsunami track, speed, height, onset times and potential coastal impact;

- issuing tsunami watches and warnings for all U.S. communities at risk and for international areas by agreement or compact; and
- increasing community preparedness and public tsunami education through the TsunamiReady™ program and outreach.

Pacific Island Compact is part of the U.S. Compact of Free Association with the Republic of the Marshall Islands, the Federated States of Micronesia, and the Republic of Palau in which the U.S. government provides basic government and commerce services including weather services to these island nations. The Compact provides the necessary funding to support the NWS WSOs and associated weather warning, forecast, and observation services for these islands. This continued investment preserves critical weather observation infrastructure and services necessary to support core NOAA mission responsibilities in the Pacific such as aviation, typhoon, and marine forecasts; climate monitoring; and support to U.S. Navy operations.

Without the continued support for Weather and Climate Services and Warnings, the National Centers, Hydrologic Services and Warnings, and the Pacific Island Compact, provided for in AFS ORF, NWS cannot continue to support a distributed network of WFOs and specialized centers comprising a workforce of meteorologists, hydrologists, climatologists, and space physicists whose expertise convert observational data and model outputs, to timely and accurate weather forecasts, warnings, and outlooks.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Analyze, Forecast, & Support	Pos./BA	2,929	559,719	2,929	560,469	0	750
	FTE/OBL	2,898	559,719	2,898	560,469	0	750

Operationalize Flood Inundation Mapping (+$750, 0 FTE/ 0 Positions) – NOAA requests an increase to fund GIS contractor support for flood inundation mapping (FIM) product creation as well as forecaster training and outreach. NWS will conduct hands-on workshops necessary for field forecasters to learn how to provide decision support services for this new capability. In addition, NWS will develop outreach materials and deliver them equitably to ensure stakeholders are familiar with the new FIM service. Successful development and dissemination of nationwide FIM requires coordination among three NWS portfolios. The total NWS request for this initiative is $5.0 million, to also include $0.5 million in Central Processing [NWS-33] and $3.75 million in Dissemination [NWS-107].

In the U.S., floods account for more loss of life and property than any other type of severe weather related event. To mitigate flooding impacts to the U.S. population and economy, this initiative will operationalize a FIM capability nationwide. Flood inundation maps provide an event-based graphical depiction of forecasted flood waters in real-time. This effort improves service equity by expanding FIM services from 110,000 miles to over 3.4 million river miles across the entire country.

FIM capability has been successfully demonstrated in Texas and the northeast U.S. as part of DOC's Agency Priority Goals. This initiative will enable completion of the development, operational implementation, and distribution of FIMs nationwide, which addresses a long-standing critical need of the public safety and emergency management community at all government levels. Moreover, this capability revolutionizes short-range planning and response to high impact flooding events for every community across the United States to help mitigate the human toll and infrastructure impacts.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

'Schedules and Milestones', 'Deliverables', and 'Performance Measures' reflect the outcomes resulting from all three program increases given the non-severability of these initiatives.

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022 – FY 2026

- Award contracts to support development of FIM datasets
- Operationalize dissemination pathways in conjunction with the availability of FIM by area

Deliverables:

- Develop the capability to routinely generate and disseminate operational real-time FIM for the full domain of the National Water Model
- Software to seamlessly process National Water Model outputs to be disseminated via the hybrid-cloud infrastructure through FIM GIS framework

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(Dollar amounts in thousands)

Performance Measures:	2022	2023	2024	2025	2026
Percentage of the continental U.S. population served by operational FIM services					
With Increase	0%	10%	30%	60%	100%
Without Increase	0%	0%	0%	0%	0%
Outyear Costs:					
Direct Obligations	750	750	750	750	750
Capitalized					
Uncapitalized	750	750	750	750	750
Budget Authority	750	750	750	750	750
Outlays	465	465	465	465	465
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligation amounts in thousands)

Activity: Analyze, Forecast and Support
Subactivity: Analyze, Forecast, and Support

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	290,163	297,132	303,955	303,955	0
11.3	Other than full-time permanent	866	888	908	908	0
11.5	Other personnel compensation	25,142	25,747	26,337	26,337	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	316,172	323,767	331,199	331,199	0
12	Civilian personnel benefits	114,260	118,064	132,302	132,302	0
13	Benefits for former personnel	281	290	326	326	0
21	Travel and transportation of persons	2,013	1,660	1,687	1,787	100
22	Transportation of things	2,596	2,061	2,106	2,106	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	12,294	16,240	16,437	16,437	0
23.2	Rental Payments to others	3,995	4,076	4,198	4,198	0
23.3	Communications, utilities and misc charges	11,165	11,503	11,821	11,821	0
24	Printing and reproduction	71	63	63	63	0
25.1	Advisory and assistance services	13,867	12,895	13,002	13,502	500
25.2	Other services from non-Federal sources	31,017	29,556	29,718	29,868	150
25.3	Other goods and services from Federal sources	2,491	2,286	2,313	2,313	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	1	1	1	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	6,366	5,809	5,777	5,777	0
31	Equipment	2,250	1,039	1,051	1,051	0
32	Lands and structures	35	28	29	29	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	9,303	7,528	7,684	7,684	0
42	Insurance claims and indemnities	3	2	3	3	0
43	Interest and dividends	4	4	4	4	0
44	Refunds	0	0	0	0	0
99	Total obligations	528,184	536,872	559,719	560,469	750

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Analyze, Forecast, & Support	Pos./BA	2,929	559,719	2,930	560,219	1	500
	FTE/OBL	2,898	559,719	2,899	560,219	1	500

Seamless Weather to Climate Fire Weather Predictions to Improve Resilience and Disaster Mitigation (+$500, 1 FTE/ 1 Position) – NOAA requests an increase to greatly improve critical decision support services (DSS) to wildland fire managers and government decision makers who have been facing increasingly devastating impacts from wildfires. The total NWS request for this initiative is $4.0 million, to also include $0.75 million in Central Processing [NWS-37], $0.75 million in Dissemination [NWS-116], and $2.0 million in Science and Technology Integration [NWS-152].

Losses from wildfires over the last decade resulted in over $5 billion in damage, with new records set in the 2020 fire season. Annually, wildfires kill 30 people and destroy over 2,800 homes. This project aims to reduce the devastating impacts of wildfires by providing NWS Incident Meteorologists (IMETs), state and local fire control, the US Forest Service, and other federal agencies with IDSS tools to prevent and fight wildfire activity. Enhanced fire weather predictions with longer lead times, robust uncertainty estimates and cascading information will allow nuanced high-tempo decisions during fire weather events thereby improving wildfire preparation and response.

According to FEMA, more than 46 million residences in 70,000 communities in the United States are near the Wildland Urban Interface (WUI), the zone of transition where structures and other human development meet or intermingle with undeveloped wildland areas, and therefore face greater risk of wildfires. Studies show that communities of color, particularly African American, Latino, and Native American communities, are often disproportionately impacted by wildfire. However NOAA lacks the capability to comprehensively identify and assess the needs of these communities, and the capacity to develop integrated decision support tools to aid wildland fire managers and vulnerable communities in planning for and responding to wildfires.

This request would bring dedicated social, behavioral, and economic science (SBES) support to NOAA's National Centers for Environmental Prediction (NCEP) which includes the Climate Prediction Center (CPC) and Storm Prediction Center (SPC), both of

which provide fire weather predictions to the decision making community. NCEP will engage stakeholders in the co-development of requirements for IDSS and prediction tools, to improve the effectiveness of services, communication, and response across climate and fire weather partners, the public and underserved communities such as Tribal governments, BIPOC, and other vulnerable populations. As a result, NWS will be better equipped in the development of fire weather products (including smoke), services, and information on timescales from hours to the first month, and provide a more comprehensive suite of information for enhanced decision-making capacity for stakeholders.

The critical success index, also known as the threat score, will be used to measure the effectiveness of the proposed DSS tools and improvements made as a result of the resources investment in the two-day fire weather forecast. It is the verification measure used for forecast performance, equal to the correct event forecasts divided by the total number of forecasts and the number of misses. Through this measure, NWS will communicate the two-day fire weather forecast and probabilistic DSS tool improvements, which support continuous support to IMETs and incident command teams for the duration of fire events in saving lives and property.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

'Schedules and Milestones', 'Deliverables', and 'Performance Measures' reflect the outcomes resulting from all four NWS program increases given the non-severability of these initiatives.

Schedule and Milestones:

FY 2022 – FY 2026

- Leveraging a NOAA Fire Weather testbed, demonstrate three new fire weather forecast and warning capabilities through Testbed experiments with participants from researchers, developers, forecasters, the inter-agency fire community, and end-users
- Conduct fire weather testbed experiments on evaluation of probabilistic guidance and messaging to improve impact-based decision support (IDSS)
- Transition of at least two new or enhanced fire weather capabilities into NWS operations annually
- Implement innovative post processing methodologies to translate specialized probabilistic fire weather guidance into effective risk communication
- Hire and sustain one Social Scientist to engage stakeholders in the co-development of requirements for DSS and prediction tools that will improve the effectiveness of fire services, communication, response, and recovery across climate and fire

weather partners, the public and in particular, underserved and often under-represented communities such as Tribal governments, BIPOC and other vulnerable populations [AFS specific milestone]

- Modernize NWS fire weather forecast and warning services at weather to climate timescales in support of disaster mitigation and improved resilience for vulnerable and underserved populations in Tribal, rural, and wildland fire interface communities

FY 2022

- Initiate a study to assess current use of NWS smoke and fire weather products and services, with a focus on underserved rural, WUI, and Tribal communities
- Conduct analysis of current fire weather forecast products and services that could be considered for inclusion in new probabilistic fire weather sub-seasonal forecasts

FY 2023

- Engage stakeholders in underserved rural, Tribal, and WUI communities, as well as wildland fire managers, emergency managers, and local officials in the co-development of requirements for decision support and prediction tools. Stakeholder engagement will include building trusted relationships and effective risk communication needs
- Develop prototype probabilistic fire weather forecast elements for daily to sub-seasonal time scales
- A synthesis and publication of climate variability and trend impact on fire ignition and spread, especially those in vulnerable communities

FY 2024

- Develop a prototype for improved NWS warning services and risk communications that include feedback from FY 2023 stakeholder engagement
- Conduct social science study on utility of prototype probabilistic fire weather forecast elements through engagement with fire weather experts, Federal land management partners, vulnerable communities and relevant Tribal organizations

FY 2025

- Evaluate prototype warning services and risk communications through direct engagement with and feedback from underserved rural, WUI, and Tribal communities
- Refine probabilistic fire weather forecast elements with social science information from FY 2024

FY 2026

- Develop an implementation plan and communications strategy for fire weather probabilistic forecast information
- Issue experimental probabilistic fire weather forecast aligned with social science studies and user feedback

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Deliverables:

- Post processing techniques for translation of specialized probabilistic fire weather guidance into effective risk estimates
- Improved next generation, nationally consistent NWS fire weather services, that exploit improved UFS numerical models, which is optimized to support fire community and diverse societal needs and critical decision support requirements
- Co-developed fire weather services and risk communications for underserved and vulnerable rural, Tribal, and WUI communities
- Probabilistic prediction of extreme weather events in support for fire management of large fire outbreaks and growth

Performance Measures	2022	2023	2024	2025	2026
Number of improved or enhanced fire weather products and tools (cumulative) [AFS specific measure]					
With Increase	0	2	3	3	5
Without Increase	0	0	0	0	0
National Fire Weather Two-Day Forecast Accuracy (Critical Success Index)					
With Increase	0.35	0.35	0.40	0.40	0.45
Without Increase	0.35	0.35	0.35	0.35	0.35
Outyear Costs:					
Direct Obligations	500	500	500	500	500

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(Dollar amounts in thousands)

Capitalized	0	0	0	0	0
Uncapitalized	500	500	500	500	500
Budget Authority	500	500	500	500	500
Outlays	310	310	310	310	310
FTE	1	1	1	1	1
Positions	1	1	1	1	1

Department of Commerce
National Oceanic and Atmospheric Administration
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PROGRAM CHANGE PERSONNEL DETAIL

Activity: Analyze, Forecast, and Support
Subactivity: Analyze, Forecast, and Support
Program Change: Seamless Weather to Climate Fire Weather Predictions to Improve Resilience and Disaster Mitigation

Title		Grade	Number	Annual Salary	Total Salaries
Social Scientist		GS-14	1	139,000	139,000
Total			1		139,000
Less lapse	25.00%		(0)		(34,750)
Total full-time permanent (FTE)			1		104,250
2022 Pay Adjustment (2.7%)					2,815
					107,065

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	1
Total FTE	1
Authorized Positions:	
Full-time permanent	1
Total Positions	1

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS

(Direct Obligations amounts in thousands)

Activity: Analyze, Forecast, and Support
Subactivity: Analyze, Forecast, and Support

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	290,163	297,132	303,955	304,062	107
11.3	Other than full-time permanent	866	888	908	908	0
11.5	Other personnel compensation	25,142	25,747	26,337	26,337	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	316,172	323,767	331,199	331,306	107
12	Civilian personnel benefits	114,260	118,064	132,302	132,344	42
13	Benefits for former personnel	281	290	326	326	0
21	Travel and transportation of persons	2,013	1,660	1,687	1,687	0
22	Transportation of things	2,596	2,061	2,106	2,106	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	12,294	16,240	16,437	16,437	0
23.2	Rental Payments to others	3,995	4,076	4,198	4,198	0
23.3	Communications, utilities and misc charges	11,165	11,503	11,821	11,821	0
24	Printing and reproduction	71	63	63	63	0
25.1	Advisory and assistance services	13,867	12,895	13,002	13,353	351
25.2	Other services from non-Federal sources	31,017	29,556	29,718	29,718	0
25.3	Other goods and services from Federal sources	2,491	2,286	2,313	2,313	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	1	1	1	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	6,366	5,809	5,777	5,777	0
31	Equipment	2,250	1,039	1,051	1,051	0
32	Lands and structures	35	28	29	29	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	9,303	7,528	7,684	7,684	0
42	Insurance claims and indemnities	3	2	3	3	0
43	Interest and dividends	4	4	4	4	0
44	Refunds	0	0	0	0	0
99	Total obligations	528,184	536,872	559,719	560,219	500

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Analyze, Forecast, & Support	Pos./BA	2,929	559,719	2,929	560,219	0	500
	FTE/OBL	2,898	559,719	2,898	560,219	0	500

Co-Development of Sub-Seasonal to Seasonal (S2S) Decision Support Services to Mitigate the Impacts of Extreme Events and Enable a Resilient Society (+$500, 0 FTE/ 0 Positions) – This increase will facilitate stakeholder engagement to gather requirements for the development of decision support services (DSS) products/services. For example, extended periods of significantly below normal temperatures can adversely impact crop planting and harvesting schedules. NOAA proposes to provide improved delivery of new publicly-available products and services which will better provide information to vulnerable and underserved communities. NOAA requests a total $5.3 million to develop S2S (week two to three months) DSS for long lead time extreme events that occur on a timeframe from weeks to months. This initiative also includes $0.9 million for high performance computing for Central Processing [NWS-43], $0.4 million for improved delivery of new products and services for Dissemination [NWS-122], and $3.5 million for Science and Technology Integration in support of DSS product/service development and training and outreach [NWS-159].

Understanding and predicting extreme events on the subseasonal to seasonal time scale and their impacts has been identified in the *Weather Research and Forecasting Innovation Act of 2017* (P.L. 115-25) and the *National Integrated Drought Information System Reauthorization Act of 2018* (P.L. 115-423) as a top national priority. Decision makers are often faced with a complex array of information including intertwining tasks required to design mitigation strategies for developing responses to high impact environmental events amid greater uncertainty, which is exacerbated by climate change.

NOAA will leverage social science to engage stakeholders across multiple sectors (e.g., agricultural, water resources, public health, emergency management, marine resources, and energy sectors), including decision makers in underserved communities such as Tribal governments, inner-city communities, economically disadvantaged rural regions, and other vulnerable populations, in the development of requirements for S2S DSS actionable data/services. Following the iterative engagement with stakeholders and end users to understand user requirements, NWS will engage with Weather/Water/Climate Enterprise partners in assessing how best to use Enterprise capabilities to meet these requirements. For those areas where NOAA services can best meet user needs, NWS in partnership with OAR, will develop specific DSS data/services that meet the requirements identified. As a result, NWS will be better

equipped to provide DSS data/services, training and outreach to maximize usability and actionable information in the user communities, and provide a more comprehensive suite of early warning information for enhanced decision-making for stakeholders. This will lead to increased resilience and improved mitigation planning to be better prepared for extreme events such as excessive heat and cold waves, extreme winds, droughts, floods, severe storms, winter storms, and tropical cyclones/hurricanes.

The proposed DSS will provide probabilistic information on the likelihood of extreme S2S climate events and use state of the science methods including ensemble post-processing of dynamical models, artificial intelligence/machine learning (AI/ML) tools, and statistical techniques and hybrid combinations of these different approaches. The product/services will be user-friendly, provide historical skill and confidence levels, and be targeted toward specific decision points for the different sectors (agriculture, water-resources, public health, emergency management, marine-resources and energy). These data/services will allow users to objectively include S2S climate prediction information as part of their decision-making processes, thereby enhancing user preparedness, planning, and resilience. The specific number and type of data/services developed will depend upon results of research on predictive skill limits and social science data gathering. Finally, we will utilize social science to evaluate the impact of these services to inform refinement of the existing and development of new data/services.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

'Schedules and Milestones', 'Deliverables', and 'Performance Measures' reflect the outcomes resulting from all four NWS program increases given the non-severability of these initiatives.

Schedule and Milestones:
FY 2022 – FY 2026
FY 2022

- Stakeholder meetings conducted to understand key climate-based impact decisions and how S2S information can inform those decisions
- NOAA and Weather/Water Climate Enterprise interactions to assess capabilities/roles in meeting user needs
- NWS and NOAA labs begin product/services development based on user needs

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

FY 2023
- Prototype sectoral specific DSS co-developed and tested with stakeholders

FY 2024
- Evaluation of prototype sectoral specific DSS
- Operationalization of 4 prototype DSS data/services

FY 2025
- Stakeholder meetings conducted to scope improvements to first-generation data/services supporting sectoral specific decision-making
- NWS and NOAA labs begin work on second generation DSS data/services Operationalization of 4 additional prototype DSS data/services

FY 2026
- Co-development and testing of second generation sectoral specific DSS

Deliverables:
- Documentation of user needs for sectoral specific DSS
- Plan for providing DSS to underserved user communities developed and executed
- Operational DSS tools for agriculture, water resources, public health, emergency management, marine resources, and energy communities
- Objectively evaluated predictive skill limits and confidence levels for S2S extreme climate events including heat and cold waves, droughts, floods, severe and fire weather, ocean heat waves, and tropical cyclones/hurricanes
- Evaluation of the impact of sectoral specific DSS

Department of Commerce
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Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of Sectoral-Specific DSS (cumulative)					
With Increase	0	0	4	4	8
Without Increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	500	500	500	500	500
Capitalized	0	0	0	0	0
Uncapitalized	500	500	500	500	500
Budget Authority	500	500	500	500	500
Outlays	310	310	310	310	310
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS

(Direct Obligations amounts in thousands)

Activity: Analyze, Forecast and Support
Subactivity: Analyze, Forecast and Support

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	290,163	297,132	303,955	303,955	0
11.3	Other than full-time permanent	866	888	908	908	0
11.5	Other personnel compensation	25,142	25,747	26,337	26,337	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	316,172	323,767	331,199	331,199	0
12	Civilian personnel benefits	114,260	118,064	132,302	132,302	0
13	Benefits for former personnel	281	290	326	326	0
21	Travel and transportation of persons	2,013	1,660	1,687	1,707	20
22	Transportation of things	2,596	2,061	2,106	2,106	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	12,294	16,240	16,437	16,437	0
23.2	Rental Payments to others	3,995	4,076	4,198	4,198	0
23.3	Communications, utilities and misc charges	11,165	11,503	11,821	11,821	0
24	Printing and reproduction	71	63	63	63	0
25.1	Advisory and assistance services	13,867	12,895	13,002	13,422	420
25.2	Other services from non-Federal sources	31,017	29,556	29,718	29,768	50
25.3	Other goods and services from Federal sources	2,491	2,286	2,313	2,313	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	1	1	1	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	6,366	5,809	5,777	5,787	10
31	Equipment	2,250	1,039	1,051	1,051	0
32	Lands and structures	35	28	29	29	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	9,303	7,528	7,684	7,684	0
42	Insurance claims and indemnities	3	2	3	3	0
43	Interest and dividends	4	4	4	4	0
44	Refunds	0	0	0	0	0
99	Total obligations	528,184	536,872	559,719	560,219	500

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Analyze, Forecast, & Support	Pos./BA	2,929	559,719	2,929	560,719	0	1,000
	FTE/OBL	2,898	559,719	2,898	560,719	0	1,000

Expand and Enhance NWS Services to Vulnerable/Underserved Communities for Extreme Events: Improve Service Delivery (+$1,000 and 0 FTE/ 0 Positions) – NWS requests an increase to improve service delivery to underserved communities. The total NWS request for this initiative is $3.0 million, to include $2.0 million in Central Processing [NWS-48].

It is well known that impacts from extreme weather affect those most vulnerable. For hazards such as tornadoes, hurricanes, and temperature extremes, adequate access to shelter should be a right, not a privilege. Low income housing, homelessness, physical disabilities, and language barriers are realities that increase vulnerability. To offset these vulnerabilities, NWS products, services, and partnerships need to strengthen individual, business, and community resilience in an equitable approach. Improved service delivery based on a better understanding of community needs and challenges will result in protective action taken, lives saved, and a reduced disruption to livelihoods.

To achieve this, investments in the social, behavioral, and economic (SBE) sciences, including training of NWS employees, are needed. At the same time, applying the SBE science and training will improve external engagement through NWS community-based programs such as StormReady/TsunamiReady and Weather-Ready Nation (WRN) Ambassadors. Building a “Weather-Ready Nation for all” can only occur when NWS forecasts, warnings, and community engagement are informed by, and better serve, the unique challenges of underserved/vulnerable populations. Further, NWS will identify and enhance services for historically underinvested and underserved communities that are at greater risk for experiencing negative health impacts related to extreme heat, tornadoes and hurricane landfalls.

Analyze, Forecast, and Support (AFS) will establish a heat community of practice, to be known as Heat Resilient Communities (HERCOM) that will focus on building trusted relationships and interdisciplinary solutions at State and local levels to increase resilience to extreme heat in underserved communities. HERCOM will facilitate table top exercises and guide the development of effective resources, tools, and risk communication. HERCOM would provide foundational tools, resources and support for

communities to tailor and implement local heat resilient solutions. HERCOM will focus on recurring engagement rather than a one-time recognition or project, bringing together local decision-makers around the shared priority of building heat resilience in their community.

AFS will also work with SBE scientists, local officials, and faith leaders to collect data on underserved/vulnerable populations' response times needed to reach public sheltering. This will be measured against NWS lead time performance metrics in hurricane and tornado-prone areas to develop a Sheltering Partnership Plan with community leaders to better protect the most vulnerable.

Finally, this investment will be incomplete without providing new, foundational training for NWS staff which will cover topics ranging from the foundational principles of social science to communicating uncertainty, probabilities and training to enhance community resilience and reach underserved and vulnerable communities.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

Schedule and Milestones:
FY 2022 - FY 2023

- Develop Professional Development Series (PDS) training materials for NWS staff which will cover topics ranging from the foundational principles of social science to communicating uncertainty, probabilities and training to enhance community resilience and reach underserved and vulnerable communities
- Establish data sharing agreements with agencies that address vulnerability to extreme heat such as the CDC, US Census Bureau, HUD, OSHA, and EPA. Agreements will include but are not limited to methodology for data use, data availability, access, and security
- Initiate a study to better understand trusted relationships and effective excessive heat messaging within underserved/vulnerable populations
- Build upon foundational relationships between NWS Weather Forecast Offices (WFOs) and local partners, and host six (6) table top exercises in urban heat island (UHI) and rural areas that are located in historically underinvested communities (one

in each NWS Region) that foster interdisciplinary strategies for increasing resilience to extreme heat and inform local Emergency Action Plans. This effort would serve as Phase 1 in the development of HERCOM

- Collect data on underserved/vulnerable populations' response times needed to reach currently available public sheltering measured against NWS lead time performance metrics in hurricane and tornado-prone areas
- Develop a Sheltering Partnership Plan to utilize the StormReady Communities Program and collaboration with Core Partners, WRN Ambassadors, and other key partners to help identify available community shelters and develop strategies to improve access for vulnerable and underserved populations

FY 2023

- Develop an effective communications plan that integrates findings from the FY2022 social science study to aid in the creation of life-saving messaging campaigns and outreach materials, to include effective communication of extreme heat forecasts and tools
- Collaborate with local officials to identify geographic locations in need of public sheltering (i.e., communities unable to access public sheltering options). Work with external partners on potential solutions, including identifying pre-existing structures located in environmentally resilient areas (e.g. not in flood zones) and designation as a community storm shelter (e.g., community centers, houses of worship)

FY 2024

- Training for WCM/SCH community to enhance community resilience particularly to underserved communities
- Use outcomes of UHI table top exercises conducted in FY2022/23 to execute Phase 2 of HERCOM - six (6) additional communities test the HERCOM framework and design associated toolkit with engagement from WFOs, local partners in underserved communities, WRN Ambassadors, and the NOAA National Heat Health Information System. The toolkit will include co-developed resources, tools, and risk communication strategies to reduce the impacts of extreme heat
- Exploring an expansion of the data collection on weather/water/climate impacts on underserved/vulnerable communities for different hazards through the development of requirements, and identification of additional data sources from other relevant federal agencies
- Evaluate deliverable/investigate expansion of community storm sheltering concepts to other weather hazard areas (beyond hurricanes and tornadoes), including wildfires and tsunamis
- Begin implementing the Sheltering Partnership Plan at the community level, with potential changes to the StormReady Program guidelines, and standard best practices and processes to engage with WRN Ambassadors and other general partners that can improve storm sheltering options in a prioritized list of vulnerable and underserved communities

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(Dollar amounts in thousands)

FY 2025

- Training for key WFO and River Forecast Center (RFC) staff to enhance community resilience particularly to underserved communities. This applied training will be the culmination of all of the prior year training initiatives
- Continue working with FEMA, local emergency management, and faith leaders to identify potential pre-existing structures to serve as shelters in vulnerable areas that do not have adequate access to community storm shelters (for other weather hazards, including wildfires and tsunamis)
- Continue implementing the Sheltering Partnership Plan at the community level, with potential changes to the StormReady Program guidelines, and standard best practices and processes to engage with WRN Ambassadors and other general partners that can improve storm sheltering options in a prioritized list of vulnerable and underserved communities
- HERCOM workshop report that informs integration of findings from FY24 HERCOM workshop into NWS outreach, education, and training; and to inform improvements to heat products and services
- HERCOM support for continued fed and local engagement; onboarding of six new communities
- Expand data collection on weather/water/climate impacts on underserved/vulnerable communities for different hazards based on related work in FY2024

FY 2026

- Training for NWS staff to enhance community resilience particularly to underserved communities. This applied training will be the culmination of all of the prior year training initiatives
- Further build and sustain HERCOM with a biennial workshop
- Continue community storm sheltering efforts as identified previously for additional at-risk areas (based on cost-benefit analyses)
- Continue implementing the Sheltering Partnership Plan at the community level, with potential changes to the StormReady Program guidelines, and standard best practices and processes to engage with WRN Ambassadors and other general partners that can improve storm sheltering options in a prioritized list of vulnerable and underserved communities

Deliverables:

- Professional Development Series (PDS) training materials which will cover topics ranging from the foundational principles of social science to communicating uncertainty, probabilities and training to enhance community resilience
    - PCU1 - Social Science foundational principles (SS modules 101, 201 & 301)
    - PCU2 - Communicating uncertainty and probabilistic information
    - PCU3 - Reaching underserved communities
    - PCU4 - Integrating social science into NWS services

  - PCU5 - Partnerships with the social science community
  - PCU6 - Customer Experience Overview: Principals, methodologies and applications for NWS operations
- Yearly post heat season evaluations that incorporate local, national and international lessons learned that improve NWS service delivery
- Improved StormReady guidelines aimed at identifying community storm shelter needs in emergency management All-Hazard Mitigation Plans in order to better promote the implementation of solutions
- 30 HERCOM participants and a HERCOM toolkit that includes customizable resources, tools, and training co-developed with federal, state and local partners that reduce heat impacts within rural and Urban Heat Island (UHI) areas with a focus on underinvested and highly vulnerable communities
- Sheltering Partnership Plan that explores changes to the StormReady Program to help support improving sheltering options, and identifies best practices and standard processes to improve sheltering access at the community level through partnering with Core Partners, WRN Ambassadors, and other general partners
- A list of at-risk vulnerable and underserved populations, including documented response time needs to guide community level sheltering improvement efforts

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(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of Local Communities Participating in HERCOM					
Communities Participating Identified with increase	6	12	18	24	30
Communities Participating without increase	0	0	0	0	0
Number of NWS WFOs and RFCs with completed training on community resilience in vulnerable and underserved communities					
Trained on community resilience with increase	0	10	50	80	130
Trained on community resilience without increase	0	0	0	30	40
Percentage of at-risk vulnerable and underserved communities where the Sheltering Partnership Plan is implemented resulting in improved sheltering options. Percent of vulnerable and underserved communities with improved sheltering options					
With Increase	0	5	20	50	70
Without Increase	0	0	0	0	0

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(Dollar amounts in thousands)

Outyear Costs:					
Direct Obligations	1,000	1,000	1,000	1,000	1,000
Capitalized	400	400	400	400	400
Uncapitalized	600	600	600	600	600
Budget Authority	1,000	1,000	1,000	1,000	1,000
Outlays	620	620	620	620	620
FTE	0	0	0	0	0
Positions	0	0	0	0	0

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National Oceanic and Atmospheric Administration
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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Analysis, Forecast, and Support
Subactivity: Analysis, Forecast, and Support

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	290,163	297,132	303,955	303,955	0
11.3	Other than full-time permanent	866	888	908	908	0
11.5	Other personnel compensation	25,142	25,747	26,337	26,337	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	316,172	323,767	331,199	331,199	0
12	Civilian personnel benefits	114,260	118,064	132,302	132,302	0
13	Benefits for former personnel	281	290	326	326	0
21	Travel and transportation of persons	2,013	1,660	1,687	1,737	50
22	Transportation of things	2,596	2,061	2,106	2,106	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	12,294	16,240	16,437	16,437	0
23.2	Rental Payments to others	3,995	4,076	4,198	4,198	0
23.3	Communications, utilities and misc charges	11,165	11,503	11,821	11,821	0
24	Printing and reproduction	71	63	63	63	0
25.1	Advisory and assistance services	13,867	12,895	13,002	13,552	550
25.2	Other services from non-Federal sources	31,017	29,556	29,718	30,118	400
25.3	Other goods and services from Federal sources	2,491	2,286	2,313	2,313	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	1	1	1	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	6,366	5,809	5,777	5,777	0
31	Equipment	2,250	1,039	1,051	1,051	0
32	Lands and structures	35	28	29	29	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	9,303	7,528	7,684	7,684	0
42	Insurance claims and indemnities	3	2	3	3	0
43	Interest and dividends	4	4	4	4	0
44	Refunds	0	0	0	0	0
99	Total obligations	528,184	536,872	559,719	560,719	1,000

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		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Analyze, Forecast, & Support	Pos./BA	2,929	559,719	2,932	561,219	3	1,500
	FTE/OBL	2,898	559,719	2,900	561,219	2	1,500

Expand and Enhance NWS Services to Vulnerable/Underserved Communities for Extreme Events: Assess and Understand User Needs (+$1,500 and 2 FTE/ 3 Positions) – NWS requests an increase to create and sustain a capability to assess and understand user needs in support of improving services to underserved communities for extreme events.

Natural disasters have proven that community resilience is only as strong as those people who are most vulnerable. Despite accurate predictions, decision making at the community, business, and individual level is complex and fraught with confusion, underestimation of risk, and inequity. Service delivery to those most underserved and vulnerable is extremely challenging, as distrust, ineffective or unavailable communications, and cultural/societal differences act as obstacles to optimizing the customer experience. We must improve our capabilities to both better support decision makers who serve those communities, as well as to improve services available to them directly.

This proposal defines the end-to-end capabilities needed to ensure the value of NWS forecasts, warnings, and partnerships result in more optimal and equitable outcomes -- communities that are ready, responsive, and resilient to extreme weather, water, and climate events. Communities that take action (mitigate) in ways equitable to all and proportional to the risks weather the storms better, recover faster, and avoid the devastating consequences of lost lives, closed businesses, and the inability to return to normal. NWS services must be tailored to provide the additional support to the most at risk communities in order to achieve equitable outcomes.

NWS proposes to hire three Social, Behavioral & Economic scientists that will assess user needs of underserved/under-resourced and hard to reach communities and identify best practices for dissemination of information to those communities. The NWS social scientists will partner with other NOAA organizations and formally assess user needs of underserved/under-resourced and hard to reach communities. NWS will build capacity, through employee training and other means, on risk communication to

underrepresented communities and use customer experience assessments to propose changes to products and services also focusing on reaching those communities. NWS will implement a survey solution and integrate it with existing data to continually gain greater insights on customer experience. NWS will maintain accountability on the provision of services to underserved communities by developing and implementing robust performance metrics and training the workforce. These funds will also leverage assistance and oversight for the NWS funding request to Increase NOAA Capability to Support Internship Opportunities [NWS-96], not limited to the execution of program priorities such as the recruitment of interns, facilitation of the application process, placement of interns, documentation and budget tracking.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

Schedule and Milestones:
FY 2022 - FY 2023

- Hire and sustain three Social, Behavioral & Economic (SBE) scientists
- In collaboration with NOAA's National Ocean Service (NOS) Office for Coastal Management (OCM) and the Office of Oceanic and Atmospheric Research (OAR) Sea Grant, identify and document best practices for communication and dissemination of information to vulnerable and underserved communities
- Assess user needs of underserved/under-resourced and hard to reach communities through qualitative methods including focus groups, in-depth interviews, ethnographies and participant observations to complement quantitative survey data. This will be a multiyear effort
- Assessment of NWS services and methodologies to identify recommendations for NWS to improve the efficacy and delivery of NWS products and services to ensure an equitable distribution of benefits to vulnerable and underserved populations across all eleven (11) national service programs[3] (NSPs) and mission support programs
- Development of a Customer Experience plan to assess user needs, including identifying gaps/shortfalls in NWS services to support underserved and highly vulnerable populations

[3] The provision of services within the NWS are grouped into 11 National Service Programs (NSPs). These include Aviation Weather, Climate, Fire Weather, Marine Weather, Public Weather, Severe Weather, Space Weather, Tropical Weather, Tsunamis, Water Resources and Winter Weather. Mission Support Programs include Impact-based Decision Support Services (IDSS), Warning Coordination Meteorologists (WCM), Preparedness and Resilience, Digital and Graphical Services, and Analysis and Nowcasting. All have their home with the Analyze, Forecast and Support (AFS) Office.

- Document requirements and begin development for an accessible, interoperable, and relational database of user experience information, such as, but not limited to; service feedback; demographics; forecast and warning performance statistics; weather-related health information; and other social, behavioral, and economic data
- Collect and leverage economic and demographic data to assess the spatial distribution of underserved and highly vulnerable populations to develop a list of prioritized communities to focus on improved services for social equity

FY 2023

- Build capacity (through training, outreach and education) around risk communication needs of underrepresented communities, based on leveraging OCM and Sea Grants efforts
- Execute new customer experience assessments with a focus on vulnerable/underserved communities, analyze results, and propose changes to products and services

FY 2024

- Invest in an enterprise-grade survey solution to capture, archive, and apply analytics to user/customer/partner experience, demographic, economic information and hazard information. The solution will have the ability to better reach nationwide populations, including vulnerable and underserved communities, by using several channels including but not limited to email, SMS, mobile apps, social media. This system will be utilized for the balance of this timeline
- Integrate a subset of existing NOAA survey data, especially IDSS survey information, into the enterprise-grade survey solution to gain greater insights on user/customer experience data from a social and behavioral science approach, with a particular emphasis on vulnerable and underserved communities
- Complete development, test, implement, and purchase licenses for the relational database of user experience information

FY 2025

- Develop robust performance metrics relating to the provision of services with emphasis on underserved communities
- Provide user training for the relational database of social, behavioral, and economic data

FY 2026

- Implement robust performance metrics relating to the provision of services with emphasis on underserved communities

Deliverables:

- A NWS Customer Experience plan that provides a roadmap for improved services, including those in underserved and vulnerable communities
- Best Practices for how to engage, build and maintain trusted relationships with underserved and vulnerable communities, including outreach and educational products that help NWS field offices better engage with underserved and vulnerable populations in their locale

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- Engagement strategies at the local office level working with Core Partners and decision makers, Weather-Ready Nation (WRN) Ambassadors, non-profit organizations, and other entities to provide services at the community level distributed to ensure vulnerable and underserved populations receive the level of support needed to achieve equitable outcomes
- NWS products and services that better serve the end user and more effectively reach the underserved and vulnerable communities
- Performance metrics that measure NWS influence on beneficial societal outcomes
- A singular, secure, and accessible enterprise-wide survey solution that will provide social and behavioral insights from the range of NOAA/NWS customers/users
- An interoperable and relational database of user experience information such as, but not limited to; service feedback; demographics; forecast and warning performance statistics; weather-related health information; and other social, behavioral, and economic data

Performance Measures	2022	2023	2024	2025	2026
Percent of National Service Programs (NSP) who conduct an assessment of products, services, and risk communication strategies, resulting in implementable product, service delivery, and communication changes to support underserved/vulnerable communities.					
Percent of NSPs with improved services for vulnerable communities with increase	0	10	30	50	70
Percent of NSPs with improved services for Vulnerable communities without increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	1,500	1,500	1,500	1,500	1,500

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Capitalized	0	0	0	0	0
Uncapitalized	1,500	1,500	1,500	1,500	1,500
Budget Authority	1,500	1,500	1,500	1,500	1,500
Outlays	930	930	930	930	930
FTE	2	3	3	3	3
Positions	3	3	3	3	3

Department of Commerce
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PROGRAM CHANGE PERSONNEL DETAIL

Activity: Analysis, Forecast and Support
Subactivity: Analysis, Forecast and Support

Title		Grade	Number	Annual Salary	Total Salaries
Social Scientist (Supervisory)		GS-14	1	138,866	138,866
Social Scientist		GS-13	1	117,516	117,516
Social Scientist		GS-13	1	117,516	117,516
Total			3		373,898
Less lapse	25.00%		(1)		(93,475)
Total full-time permanent (FTE)			2		280,424
2022 Pay Adjustment (2.7%)					7,571
					287,995

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	2
Total FTE	2
Authorized Positions:	
Full-time permanent	3
Total Positions	3

Department of Commerce
National Oceanic and Atmospheric Administration
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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Analysis, Forecast and Support
Subactivity: Analysis, Forecast and Support

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	290,163	297,132	303,955	304,243	288
11.3	Other than full-time permanent	866	888	908	908	0
11.5	Other personnel compensation	25,142	25,747	26,337	26,337	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	316,172	323,767	331,199	331,487	288
12	Civilian personnel benefits	114,260	118,064	132,302	132,388	86
13	Benefits for former personnel	281	290	326	326	0
21	Travel and transportation of persons	2,013	1,660	1,687	1,737	50
22	Transportation of things	2,596	2,061	2,106	2,106	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	12,294	16,240	16,437	16,437	0
23.2	Rental Payments to others	3,995	4,076	4,198	4,198	0
23.3	Communications, utilities and misc charges	11,165	11,503	11,821	11,821	0
24	Printing and reproduction	71	63	63	63	0
25.1	Advisory and assistance services	13,867	12,895	13,002	14,068	1,066
25.2	Other services from non-Federal sources	31,017	29,556	29,718	29,718	0
25.3	Other goods and services from Federal sources	2,491	2,286	2,313	2,313	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	1	1	1	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	6,366	5,809	5,777	5,787	10
31	Equipment	2,250	1,039	1,051	1,051	0
32	Lands and structures	35	28	29	29	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	9,303	7,528	7,684	7,684	0
42	Insurance claims and indemnities	3	2	3	3	0
43	Interest and dividends	4	4	4	4	0
44	Refunds	0	0	0	0	0
99	Total obligations	528,184	536,872	559,719	561,219	1,500

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Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Analyze, Forecast, & Support	Pos./BA	2,929	559,719	2,929	560,719	0	1,000
	FTE/OBL	2,898	559,719	2,898	560,719	0	1,000

Increase NOAA Capability to support Minority Internship opportunities (+$1,000, 0 FTE/ 0 positions) - NWS proposes to expand funding for early career employment opportunities in partnership with Minority Serving Institutions (MSIs) and Historically Black Colleges and Universities (HBCUs).

NWS proposes to expand the ability to transition eligible Black, Indigenous and People of Color (BIPOC) students in atmospheric sciences, engineering, data science, social science, and software development to positions within the 150+ NWS offices across the Nation. The transition path includes collaborative research to operations projects, mentorship opportunities, undergraduate and graduate internships, and early career job opportunities where people study and live. This pairs with the programs supported by the NOAA Office of Education to increase outreach and education in underrepresented and underserved populations in urban and rural communities, and ties directly to the NOAA Diversity and Inclusion Action Plan.[4]

More specifically, the NWS will establish the *June Bacon-Bercey (JBB) Internship Program*. June Bacon-Bercey was the first African American woman to earn a degree in meteorology. She began her career in the NWS as a weather analyst and forecaster, and then worked as a broadcast meteorologist - becoming the first woman and African American woman to receive the American Meteorological Society's "Seal of Approval." The NWS JBB Internship program acknowledges her legacy of increasing participation of African Americans in meteorology and geophysical sciences. The JBB Internship Program will create a job pathway for eligible HBCU/MSI rising seniors and graduate students, and BIPOC students that have participated in NOAA Cooperative Science Centers or other NOAA internship programs.

NWS will provide a stipend to cover summer work experience for JBB Intern participants with the intent of transitioning eligible graduating interns to full time employees as positions become available. Students will be recruited with expertise in NWS science

[4] https://www.corporateservices.noaa.gov/~civilr/d&i/Diversity_and_Inclusion_Implementation_Plan.html

and service areas such as operational meteorology, research, engineering, communications and social science. NWS will establish an oversight committee with responsibilities including but not limited to developing program goals, policy, procedures, and governance; oversight of intern selection, identifying mentorship opportunities and developmental activities, evaluating program performance, and providing updates to senior NWS or NOAA leadership. Housing is known to be a major barrier for BIPOC student participation in summer programs. Thus, similar to the NOAA Educational Partnership Program, the JBB Internship Program will also provide BIPOC students with a housing allowance for the duration of their 10 week summer internship at a NWS facility. The Steering Committee will be supported by a program manager with responsibilities including but not limited to execution of program priorities such as the recruitment of interns, facilitation of the application process, placement of interns, documentation and budget tracking. This GS-14 program manager will be leveraged from the funding request to Assess and Understand User Needs (Page NWS-89) and is required to provide adequate oversight and management of the interns. NWS will work to transition all eligible JBB interns into full time employees each year, with the goal to increase the number of BIPOC employees in NWS by 14% by 2026. The JBB Internship Program will also provide mentorship, connection to NOAA Employee Resource Groups, advancement opportunities, and other efforts that will aid in the retention of BIPOC employees.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

[1]The NOAA Office of Education, Educational Partnership Program (EPP) permits a paid stipend and housing allowance during summer internships.[5]

Schedule and Milestones:
FY 2022 – FY 2026
FY 2022
- Formally establish the JBB Internship program, Steering Committee and Program Manager. Develop policies and procedures, identify mentors, and engage NWS leadership across all offices on a call for participation

FY 2023
- Announcement/Roll out of program and selection of 1st cohort

[5] https://www.noaa.gov/office-education/epp-msi/undergraduate-scholarship

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Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

FY 2024
- Evaluate and maintain program, selection of 2nd cohort

FY 2025
- Evaluate and maintain program, selection of 3rd cohort

FY 2026
- Program review, maintain program, selection of 4th cohort

Deliverables:
- Students trained in NOAA/NWS science and service areas such as operational meteorology, research, engineering, communications and social science
- 80 trained students transitioned into full time positions in NWS that fulfill the mission of the agency by end of 2026
- A recruitment program that is inclusive of BIPOC students and responsive to the NWS 2020 Diversity and Inclusion plan

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of students entering the JBB internship program					
With Increase	0	20	20	20	20
Without Increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	1,000	1,000	1,000	1,000	1,000
Capitalized	0	0	0	0	0
Uncapitalized	1,000	1,000	1,000	1,000	1,000
Budget Authority	1,000	1,000	1,000	1,000	1,000
Outlays	620	620	620	620	620
FTE	0	0	0	0	0
Positions	0	0	0	0	0

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Analysis, Forecast and Support
Subactivity: Analysis, Forecast and Support

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	290,163	297,132	303,955	303,955	0
11.3	Other than full-time permanent	866	888	908	908	0
11.5	Other personnel compensation	25,142	25,747	26,337	26,337	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	316,172	323,767	331,199	331,199	0
12	Civilian personnel benefits	114,260	118,064	132,302	132,302	0
13	Benefits for former personnel	281	290	326	326	0
21	Travel and transportation of persons	2,013	1,660	1,687	2,287	600
22	Transportation of things	2,596	2,061	2,106	2,106	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	12,294	16,240	16,437	16,437	0
23.2	Rental Payments to others	3,995	4,076	4,198	4,198	0
23.3	Communications, utilities and misc charges	11,165	11,503	11,821	11,821	0
24	Printing and reproduction	71	63	63	63	0
25.1	Advisory and assistance services	13,867	12,895	13,002	13,002	0
25.2	Other services from non-Federal sources	31,017	29,556	29,718	29,718	0
25.3	Other goods and services from Federal sources	2,491	2,286	2,313	2,313	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	1	1	1	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	400	400
26	Supplies and materials	6,366	5,809	5,777	5,777	0
31	Equipment	2,250	1,039	1,051	1,051	0
32	Lands and structures	35	28	29	29	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	9,303	7,528	7,684	7,684	0
42	Insurance claims and indemnities	3	2	3	3	0
43	Interest and dividends	4	4	4	4	0
44	Refunds	0	0	0	0	0
99	Total obligations	528,184	536,872	559,719	560,719	1,000

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Dissemination
Subactivity: Dissemination

Goal Statement

The ability to communicate warnings and forecasts to the American public is essential to protecting property and saving lives. To be effective, NWS requires a scalable, robust, secure, 24 hours a day, 7 days a week operational dissemination infrastructure, an optimized network that meets capacity requirements, and a sophisticated suite of communications systems to meet varied customer needs in a timely, reliable and authoritative manner in support of the Department of Commerce 2018-2022 Strategic Plan, Strategic Objective 3.3 Reduce Extreme Weather Impacts.

Base Program

Forecasts and warnings are transmitted using the infrastructure provided by the Dissemination Activity. Dissemination maintains communication technology required by NWS for the collecting, tailoring, and distribution of data and products. The resilient Integrated Dissemination Program (IDP) is an on-premise private cloud located in Boulder, CO, and College Park, MD. The IDP collects and distributes watches, warnings, advisories, data, and products internally and externally. Information is provided to multiple users in a variety of formats including satellite broadcast and terrestrial (Earth-based) networks, internet, radio, and partner briefing webinars. Current major systems included in IDP are the NWS Geostationary Weather Satellite Antenna System, NWS web and GIS services, NOAA Weather Radio (NWR), the Emergency Managers Weather Information Network (EMWIN), and an extensive network, OneNWS Network, connecting NWS sites to one another and to NWS partners. The IDP infrastructure is the mission critical communications hub that delivers information to different dissemination networks, such as to NWS offices, over the OneNWS Network, to the public with wireless emergency alerts through FEMA Integrated Public Alert and Warning System (IPAWS), and to emergency managers via EMWIN.

Building on the successes in the last few years of implementing robust geographically-diverse dissemination systems and upgrading the network infrastructure, including the increased bandwidth that will be implemented in late FY 2021 or early FY 2022, NWS will operationally maintain and operate the existing IDP application services including the legacy NWSChat application, Advanced Hydrologic Prediction Service (AHPS), and the Common Alerting Protocol (CAP) Handler application. Implemented in FY 2021, the CAP Handler application, in partnership with FEMA IPAWS, enables NWS to support the ability to amplify non-weather emergency messages, from First Responders and the Emergency Management community, for broadcast over appropriate NWR transmitters. Furthermore, NWS will maintain an IDP system availability rate of 97 percent providing 24x7 support to maintain existing

infrastructure and dissemination services with application failover between IDP data centers in 15 minutes or less.

In FY 2022, NWS will continue to maintain a NWR system availability rate of 96 percent, and have a maximum transit time for warning messages of one second or less for system latency at 1,030 locations. In FY 2022, NWS will demonstrate the use of the NOAA public cloud utility contract to provide GIS-based web services, and Flood Inundation Mapping to the weather enterprise and the American Public.

To ensure a WRN and optimize the delivery of scalable and agile dissemination capabilities, the NWS organized the Dissemination Subactivity around infrastructure, networks, web services and other warning-delivery services.

In general, activities in the Dissemination portfolio will perform the following:

- Operate NWS' information technology (IT) dissemination infrastructure and services;
- Identify NWS' dissemination requirements and gaps;
- Analyze NWS' system capabilities;
- Maintain, and support a scalable and geographically diverse redundant NWS dissemination architecture (IDP) consistent with, and part of, the NOAA enterprise architecture;
- Maintain a strategy to maximize effectiveness while minimizing cost; and
- Maintain and operate NWS' dissemination system capabilities including IDP and NWS networks at 97 percent operational availability.

Statement of Operating Objectives

Schedule and Milestones:

FY 2022 – FY 2026

- Maintain NWR service at 96 percent availability
- Maintain IDP services and NWS Global Information System Centers services at 97 percent reliability
- Maintain existing Enterprise Geospatial and Web Services to accommodate data providers, users and increase data throughput via both the on-premise private cloud infrastructure (IDP) and through NOAA public cloud services
- Execute approved and resourced Roadmap for future Weather Distribution Services to support a WRN
- Operate and maintain OneNWS Network bandwidth/reliability
- Manage IDP system usage, reliability, and resources

- Operate and maintain IDP Applications
- Operate and maintain water-related products and services such as Flood Inundation Mapping
- Maintain operational support and maintenance of IDP on-premise private cloud infrastructure in College Park, MD, and Boulder, CO
- Maintain operational support and maintenance of NWS Geostationary Weather Satellite Antenna System
- Maintain operational support and maintenance of a backup NWS network through a Very-Small-Aperture Terminal antenna system at each NWS Weather Forecast Office (WFO)
- Maintain and support NWS networks under the GSA Enterprise Infrastructure Solutions (EIS) contract as we begin to transition to the new contract

Deliverables:

- Maximum transit time for warning messages of less than 15 seconds
- NWR service availability at 96 percent
- Overall IDP system availability at 97 percent
- Integration of enhanced weather data and web services operationally supported on IDP system with resilience
- 8 hours a day /5 days or 24 hours a day/7 days a week support (varies by service) of Operational Terrestrial and Satellite Networking Services
- 8 hours a day /5 days a week support of NWS GIS and Web Services and Flood Inundation Mapping Services via a NOAA Public Cloud service

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Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

		2020 Actual		2021 Enacted		2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Dissemination	Pos/BA	75	76,675	78	78,344	78	80,828
	FTE/OBL	74	76,732	77	78,344	77	80,828

NWS operates and maintains critical infrastructure, which enables the provision of NOAA's services to the Nation. NWS manages a distributed network of offices that span the United States and its territories, delivering essential NOAA services, especially those related to high-impact events at the local level where critical, life-saving decisions are made. This includes the management of all major weather observing systems from software engineering and communications, to facilities and logistics planning. NWS also ensures worldwide acquisition and delivery of weather and water data through its private-cloud IDP systems, web and GIS services, public cloud services, and the OneNWS Network.

Dissemination maintains the following programs to accomplish this activity:

Dissemination IT Infrastructure and Virtualized Application Services within the IDP provides a scalable, robust, secure dissemination IT infrastructure in two geographically diverse locations, for NWS, NOAA and Federal partners.

- Weather and environmental disturbances can disrupt virtually every major public infrastructure system including transportation systems, power grids, telecommunications, and emergency response systems that protect the public. Facing these interruptions, users could be cut off from government services. Minutes (sometimes seconds) count in saving lives and the performance of the NWS dissemination systems to supply necessary information quickly is crucial.
- The IDP infrastructure is the Nation's hub for collecting and distributing weather data and products. Applications within the IDP systems automatically collect and distribute a wide variety of environmental data such as observations, analysis, and forecast products to WFOs, National Centers, NWS web-services, broadcasters, the commercial meteorological community, and major international partners. These time-perishable data products are distributed to ensure the fastest availability of the fully integrated information within IDP in College Park, MD, and Boulder, CO.
- NWS IDP applications and services provide users with flexible access to observational weather data, hazardous weather information, and other weather forecast products required for air traffic management. NOAA provides data discovery services, data format translation, and dissemination services to improve the accuracy and availability of weather information.

Terrestrial and Satellite Networking Services ensures the required networking capacity and reliability to deliver critical weather

data for internal and external partners. NWS operates and maintains critical terrestrial and satellite networking capabilities. With its updated IT infrastructure, NWS ensures adequate processing, delivery, and exploitation of new environmental satellite, model, and radar data. These terrestrial and satellite operational networks enable NWS to use the new data to improve the accuracy and timeliness of weather warnings and forecasts.

- NWS manages the OneNWS Network, a distributed network of terrestrial telecommunication circuits, satellite communications space segments, wireless, and broadband capabilities that span the Nation, including the Pacific and Alaskan regions, delivering essential NOAA data.
- NWS manages the backup satellite network services, Very Small Aperture Terminals implemented at CONUS WFOs and the Tsunami Warning Center.
- NWS National Centers, Pacific Region, and Alaska Region Offices require full resolution and aerial coverage of satellite imagery and products to achieve their mission. NWS provides the operational support and maintenance for the GOES-16, GOES-17, and Himawari-8 Re-Broadcast Antennas at the National Hurricane Center, Inouye Research Center, WFO Guam, WFO Anchorage, Aviation Weather Center, Storm Prediction Center, Space Weather Prediction Center, and NOAA Center for Weather and Climate Prediction.
- In FY 2022, NWS will continue to sustain and operate the infrastructure to meet the NWS mission.
- In FY 2022, NWS will continue the transition of network services from GSA's Networx contract to the Enterprise Infrastructure Solutions contract. GSA expects this transition to be complete in FY 2023; however, it will depend on resource availability for both network engineering expertise and circuit transition costs.

Weather Information Distribution Services provides the capabilities to communicate weather-related warnings directly to emergency managers and the American public. These services include providing NWS data and product access for international partners via the World Meteorological Organization Information Systems and the robust NWS Global Information System Centers. NWS operates several weather warning services systems:

- NOAA Weather Radio (NWR) is a national warning network consisting of 1,030 transmitter stations with a broadcast coverage that reaches more than 96 percent of the Nation's population, providing critical weather and other hazard information to the U.S. public and media outlets. NWR is the only NWS dissemination system capable of reaching individuals at nominal cost (individual purchase of NOAA weather radio) in both rural and urban locations as well as across the coastal marine waters to serve the boater community.
- EMWIN provides the emergency management community with direct access to a set of NWS warnings, watches, forecasts, and other products via either satellite broadcast or an internet connection.
- NOAA Weather Wire Service (NWWS) is a satellite data collection and dissemination system that provides NWS partners, Federal, state, local emergency managers, and the public with timely delivery of meteorological, hydrological,

climatological, and geophysical information. The vast majority of NWWS products are weather and hydrologic forecasts and warnings issued around the clock from NWS Forecast Offices. NWWS is one method used to activate the Emergency Alert System.

- HazCollect/Common Alerting Protocol (CAP) Handler application has the ability to amplify non-weather emergency messages out through NWS delivery channels. These non-weather emergency messages, such as Civil Emergencies, from authorized local, state, and Federal partners are delivered to NWS IDP by FEMA's IPAWS
- Web and Geographic Information System (GIS) services enable the access and delivery of NOAA and NWS data and products to forecasters, NOAA users, Federal partners (FAA, FEMA), the Weather Enterprise, as well as the international community and public.
- In FY 2019, NWS initiated the exploration of public cloud use to expand the capabilities of IDP, considering it for applications that do not perform primary mission essential functions. In FY 2020, the NWS demonstrated the use of the development environment of one of its largest applications currently operational on IDP, thereby conserving space on the IDP private cloud for the operational environment. In early FY 2021, NWS successfully transitioned the Damage Assessment Toolkit to the NOAA Amazon Web Service public cloud environment via NOAA's Cloud Utility Contract vehicle. The Damage Assessment Toolkit application fits the NWS selection criteria to run in a public cloud framework since the information it provides does not require high availability or low latency, but is for use by the NWS in the aftermath of severe weather. If, in FY 2021, NWS is successful demonstrating the Enterprise National GIS Viewer and Flood Inundation Mapping in a public cloud environment, FY 2022 will include continued support and enhancements of these services.

Without the continued support for Dissemination IT Infrastructure and Virtualized Application Services, Terrestrial and Satellite Networking Services, and the Weather Information Distribution System, provided for in Dissemination ORF, NWS cannot continue to support the operations of the network and communication infrastructure. This includes the OneNWS Network, the on-premise private cloud (IDP) infrastructure and applications, the off-premise public cloud infrastructure and applications, and NOAA Weather Radio, all of which are required in order to distribute forecasts, warnings, and other products to customers, partners, and the American public.

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Operations, Research and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Dissemination	Pos./BA	78	80,828	78	84,578	0	3,750
	FTE/OBL	77	80,828	77	84,578	0	3,750

Operationalize Flood Inundation Mapping (+$3,750, 0 FTE/ 0 Positions) – NOAA requests an increase to expand and operationalize the dissemination of flood inundation mapping (FIM) with a hybrid-cloud approach utilizing both on-premise private cloud and public cloud services. This request includes contractor support to ensure 24x7 availability, utility contract, and direct connections required to deliver GIS-based data to the public cloud for storage, egress, and availability. NOAA will also initiate a service delivery model for FIM. Successful development and dissemination of nationwide FIM requires coordination among three NWS portfolios. The total request for this initiative is $5.0 million, to also include $0.75 million in Analyze, Forecast, and Support [NWS-65] and $0.5 million in Central Processing [NWS-33].

In the United States, floods account for more loss of life and property than any other type of severe weather related event. To mitigate flooding impacts to the U.S. population and economy, this initiative will operationalize a FIM capability nationwide. Flood inundation maps provide an event-based graphical depiction of forecasted flood waters in real-time. This effort improves service equity by expanding FIM services from 110 thousand to over 3.4 million river miles across the entire country.

FIM capability has been successfully demonstrated in Texas and the northeast U.S. as part of NOAA's only DOC Agency Priority Goals. This initiative will enable the NWS to complete the development, operational implementation, and distribution of FIMs nationwide, which addresses a long-standing critical need of the public safety and emergency management community at all government levels. Moreover, this capability revolutionizes short-range planning and response to high impact flooding events for every community across the United States to help mitigate the human toll and infrastructure impacts.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Schedules and Milestones', 'Deliverables', and 'Performance Measures' reflect the outcomes resulting from all three program increases given the non-severability of these initiatives.

Schedule and Milestones:
FY 2022 – FY 2026

- Award contracts to support development and operational support of FIM datasets
- Operationalize dissemination pathways in conjunction with the availability of FIM by area

Deliverables:

- Develop the capability to routinely generate and disseminate operational real-time FIM for the full domain of the National Water Model
- Software to seamlessly process National Water Model outputs to be disseminated via the hybrid-cloud infrastructure through a NWS enterprise FIM GIS framework

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures:	2022	2023	2024	2025	2026
Percentage of the continental U.S. population served by operational FIM services					
With Increase	0%	10%	30%	60%	100%
Without Increase	0%	0%	0%	0%	0%
Outyear Costs:					
Direct Obligations	3,750	3,750	3,750	3,750	3,750
Capitalized					
Uncapitalized	3,750	3,750	3,750	3,750	3,750
Budget Authority	3,750	3,750	3,750	3,750	3,750
Outlays	2,325	2,325	2,325	2,325	2,325
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
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Operations, Research and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligation amounts in thousands)

Activity: Dissemination
Subactivity: Dissemination

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	9,568	9,863	10,077	10,077	0
11.3	Other than full-time permanent	19	19	20	20	0
11.5	Other personnel compensation	352	363	371	371	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	9,939	10,245	10,468	10,468	0
12	Civilian personnel benefits	3,347	3,487	3,874	3,874	0
13	Benefits for former personnel	11	11	12	12	0
21	Travel and transportation of persons	187	189	191	191	0
22	Transportation of things	52	50	52	52	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	3,130	3,324	3,358	3,358	0
23.2	Rental Payments to others	4,772	4,869	5,015	5,015	0
23.3	Communications, utilities and misc charges	22,735	23,235	24,124	24,124	0
24	Printing and reproduction	6	7	7	7	0
25.1	Advisory and assistance services	2,945	3,263	3,293	7,043	3,750
25.2	Other services from non-Federal sources	24,552	24,556	25,263	25,263	0
25.3	Other goods and services from Federal sources	566	618	625	625	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	2,375	2,419	2,438	2,438	0
31	Equipment	1,379	1,339	1,364	1,364	0
32	Lands and structures	1	1	1	1	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	731	727	740	740	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	3	3	3	3	0
44	Refunds	0	0	0	0	0
99	Total obligations	76,732	78,344	80,828	84,578	3,750

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Dissemination	Pos./BA	78	80,828	78	97,828	0	17,000
	FTE/OBL	77	80,828	77	97,828	0	17,000

Optimize and Upgrade the Integrated Dissemination Program (+$17,000, 0 FTE/ 0 Positions) – NWS requests an increase to optimize and upgrade the National Dissemination Program on-premise IT infrastructure and applications, and to build the public cloud framework, by focusing on activities within Phases 3 and 4 of the Integrated Dissemination Program (IDP) plan. These activities will provide the public and core partners with timely critical warnings, watches, and forecasts that protect lives and property.

As a result of outdated applications, systems, and limited resources (management, technical, and budgetary), during high impact events, NWS can no longer ensure the delivery of critical observations, model guidance, forecasts, and watch and warning information to NWS meteorologists, the public, the Weather Enterprise, and emergency management partners. Full implementation of the IDP plan will allow NWS to implement a long-term NWSChat solution in the public cloud, update Spot and NOAA Weather-Wire Service applications and implement them on the most optimal operationally-supported infrastructure, fully staff the application upgrade support team, and transition applications that will benefit from the scalability of the public cloud to that platform. It also provides necessary support to reinstate 24x7 hardware support and a refresh to mitigate system outages; provides for IDP hardware upgrades and software maintenance; and supports the sustainment of weather model data dissemination and existing GIS services being hosted in the public cloud using Infrastructure-as-a-service.

Phase 3 of the IDP plan includes the migration of the seventeen remaining dissemination applications which reside on legacy system environments that cannot reliably support them. NWS will implement these applications over the next five years to either the reliable 24x7 supported private cloud IDP system environment, or to an off-premise public cloud framework aligned with the OMB “Cloud Smart” strategy. Without these periodic enhancements and upgrades, the applications will compromise the ability of the NWS to fulfill its mission.

Phase 4 of the IDP plan entails establishing a Technical Cloud Migration Team to transition non-mission essential applications, such as GIS-based services, off the IDP to the public cloud via the NOAA Unisys Cloud Utility and Big Data Project contracts, as well as

the applications that enable the delivery of and visualization of NOAA Numerical Weather Prediction model data. NWS will also proceed with a commercial-off-the-shelf (COTS) solution to replace the legacy NWSChat and host it on the public cloud. This migration will allow NWS to maximize the space on IDP to upgrade to existing IDP mission-critical applications and redesign and deploy an improved NWS weather.gov website as well as NOAA Weather-Wire Service (NWWS) and Spot. Utilizing cloud services to host NWS applications at times of dramatically increased usages during weather events allows for greater ease of resource scalability to meet peak demand that on-premise solutions cannot do as quickly. This flexibility helps meet customer needs and keeps costs lower than on-premise solutions.

Without these updates, the outdated legacy versions of these applications will compromise the ability of the NWS to deliver critical observations, model guidance, forecasts, and watch and warning information to NWS meteorologists, the public, the Weather Enterprise, and emergency management partners in a reliable and timely manner. To ensure the IDP systems perform to meet customer demand, NWS also requires additional system administrators, software developers, and on-boarding specialists to transition, test, and implement the applications to run on IDP, as well as system and network engineers to support the infrastructure and applications on a 24x7 basis.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:

FY 2022 - FY 2025

- Provide IDP hardware and software maintenance to support NWS dissemination systems
- Increase the IDP network capacity in College Park, MD, and Boulder, CO, to improve the availability and access of mission critical forecast products, watches, warnings, and observations
- Establish contractual services for the required level of support of the existing IDP applications
- Increase the IDP network capacity in College Park, MD, and Boulder, CO, to improve the availability and access of mission critical forecast products, watches, warnings, and observations
- Initiate the optimization of the operational performance of NWSChat, NWWS, and Spot

FY 2023 - FY 2026

- Continue to operate and maintain NWS mission-critical delivery systems and applications on the IDP infrastructure
- Enable the maintenance and enhancements of IDP applications

- Complete the optimization and sustaining operational capability of NWSChat, NWWS, and Spot on either a NWS supported private cloud or public cloud environment

Deliverables:

- Increase availability of Primary Mission Essential Functions on IDP to 99%
- Enable routine timely access to IDP delivery services
- Transition application development environments to a public cloud instance, as appropriate and as resourced
- Achieve a 24x7 fully resourced support model for operational applications on the IDP private cloud systems
- Achieve a 24x7 fully resourced support model for operational applications on the IDP private cloud systems including NWWS, and Spot
- Achieve 24x7 support of a fully optimized long-term NWSChat solution hosted in the public cloud

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of IDP upgrades/enhancements to existing IDP applications					
With Increase	3	7	11	15	17
Without Increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	17,000	17,000	17,000	17,000	17,000
Capitalized	16,300	16,300	16,300	16,300	16,300
Uncapitalized	700	700	700	700	700
Budget Authority	17,000	17,000	17,000	17,000	17,000
Outlays	10,540	10,540	10,540	10,540	10,540
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligation amounts in thousands)

Activity: Dissemination
Subactivity: Dissemination

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	9,568	9,863	10,077	10,077	0
11.3	Other than full-time permanent	19	19	20	20	0
11.5	Other personnel compensation	352	363	371	371	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	9,939	10,245	10,468	10,468	0
12	Civilian personnel benefits	3,347	3,487	3,874	3,874	0
13	Benefits for former personnel	11	11	12	12	0
21	Travel and transportation of persons	187	189	191	191	0
22	Transportation of things	52	50	52	52	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	3,130	3,324	3,358	3,358	0
23.2	Rental Payments to others	4,772	4,869	5,015	5,015	0
23.3	Communications, utilities and misc charges	22,735	23,235	24,124	24,824	700
24	Printing and reproduction	6	7	7	7	0
25.1	Advisory and assistance services	2,945	3,263	3,293	3,293	0
25.2	Other services from non-Federal sources	24,552	24,556	25,263	25,263	0
25.3	Other goods and services from Federal sources	566	618	625	15,925	15,300
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	2,375	2,419	2,438	2,438	0
31	Equipment	1,379	1,339	1,364	2,364	1,000
32	Lands and structures	1	1	1	1	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	731	727	740	740	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	3	3	3	3	0
44	Refunds	0	0	0	0	0
99	Total obligations	76,732	78,344	80,828	97,828	17,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Dissemination	Pos./BA	78	80,828	78	81,578	0	750
	FTE/OBL	77	80,828	77	81,578	0	750

Seamless Weather to Climate Fire Weather Predictions to Improve Resilience and Disaster Mitigation (+$750, 0 FTE/ 0 Positions) – This increase will provide the development and implementation of web-based tools and graphical user interfaces. The total NWS request for this initiative is $4.0 million, to also include $0.75 million in Central Processing [NWS-37], $0.5 million in Analyze, Forecast, and Support [NWS-69], and $2.0 million in Science and Technology Integration [NWS-152].

The 2020 fire season was a record-setting one for the state of California and the United States as a whole. By November 2020, the National Interagency Fire Center reported that there were 52,113 wildfires that had burned 8,889,297 acres in 2020 - approximately 2.3 million more acres burned than the 10-year average and almost double the acreage burned in the 2019 season. Losses from wildfires over the last decade resulted in over $5 billion in damage. Annually, wildfires kill 30 people and destroy over 2,800 homes. Furthermore, non-local air quality and health impacts from wildfires are felt across the nation due to the advection of smoke and emissions. This project aims to reduce the devastating impacts of future wildfires by providing NWS Incident Meteorologists (IMETs), state and local fire control, the forest service, and other federal agencies with decision support service (DSS) tools to prevent and fight increased wildfire activity.

Since weather conditions impact how fires start and how they move, this project will result in improved DSS tools through the use of innovative science and technology improvements, including the development and use of probabilistic model ensembles, in better interpreting meteorological conditions, assessing their effects, and communicating that information to fire crews and incident command teams. These tools will enable continuous support for the duration of fire weather incidents, providing IMETs and incident command teams with scenarios for which fires will move and evolve for the duration of an event, in preventing loss of life and property. Through this work, a new NOAA Fire Weather Testbed resourced by NOAA OAR will be established, facilitating close coordination between NWS, other Federal agencies, state and local fire control, the forecast service, emergency managers, and other NOAA line offices through the NOAA Weather, Water, Climate Council.

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

This project proposes the development and implementation of a comprehensive, integrated, seamless suite of prediction and DSS tools for fire weather on timescales from hours to sub-seasonal and spatial scales from local to national. Scientists from NWS and the NOAA Labs will work with NWS fire weather experts, US Forest Service partners, and relevant Tribal organizations to develop ensemble-based probabilistic prediction tools utilizing the NOAA Unified Forecast System (UFS) and multi-model ensembles. The goal of the project is to provide wildland fire managers with more accurate predictions at longer lead times; predictions that will include robust uncertainty estimates and cascading information to allow nuanced high-tempo decisions during fire weather events thereby increasing their ability to effectively plan for and respond to wildfires.

NWS will enhance the fire weather warning program through improved methods for predicting extreme fire danger, including use of probabilistic guidance, and better messaging of impact-based decision support. Leveraging the NOAA testbed resourced through OAR, testbed activities will be conducted with the fire community, focused on evaluating diverse methods of predicting and communicating conditions supportive of extreme fire danger and fire behavior. NWS will invest in a robust suite of fire weather numerical model post processing including specialized probabilistic fire weather guidance to improve NWS fire weather forecasts, warnings and impact-based decision support services. NWS will also strengthen research-to-operations partnerships with both OAR, university researchers, and the broader inter-agency fire weather community through effective fire weather focused testbed engagements. The NWS will focus improvements in numerical model forecasts of fire weather critical conditions, including the effects of complex terrain, in coordination with the UFS and Earth Prediction Innovation Center. Probabilistic prediction of fire weather conditions will be incorporated into UFS numerical models focusing on both local (Rapid Refresh Forecast System or RRFS) and national (Global Ensemble Forecast System or GEFS) scales, beginning with improving NWS objective measures of success for fire weather that will translate into improved services for society including underserved and vulnerable populations.

The critical success index, also known as the threat score, will be used to measure the effectiveness of the proposed DSS tools and improvements made as a result of the resources investment in the two-day fire weather forecast. It is the verification measure used for forecast performance, equal to the correct event forecasts divided by the total number of forecasts and the number of misses. Through this measure, NWS will communicate the two-day fire weather forecast and probabilistic DSS tool improvements, which support continuous support to IMETs and incident command teams for the duration of fire events in saving lives and property.

‘Schedules and Milestones’, ‘Deliverables’, and ‘Performance Measures’ reflect the outcomes resulting from all four NWS program increases given the non-severability of these initiatives.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:

FY 2022 – FY 2026

- Leveraging a NOAA Fire Weather testbed, demonstrate three new fire weather forecast and warning capabilities through Testbed experiments with participants from researchers, developers, forecasters, the inter-agency fire community, and end-users
- Conduct fire weather testbed experiments on evaluation of probabilistic guidance and messaging to improve IDSS
- Transition of at least one new or enhanced fire weather capabilities into NWS operations annually
- Implement innovative post processing methodologies to translate specialized probabilistic fire weather guidance into effective risk communication

FY 2022

- Work with SBES experts to survey fire partners and underserved communities to identify needed fire weather service improvements, and focus testbed developmental efforts
- Provide improved nationally consistent, hourly updating probabilistic lightning guidance that will be implemented through the incorporation of hourly high resolution, fine scale numerical model (High-Resolution Rapid Refresh (HRRR) or RRFS) guidance within existing NWS National Blend Model (NBM) lightning guidance
- Develop new fire weather focused metrics to measure and focus national and regional scale UFS numerical forecast improvement

FY 2023

- Provide improved nationally consistent probabilistic lightning density guidance from Day 1 through Day 2 in support of local and national impact-based decision support services requirements
- Implement new fire weather focused metrics to measure and focus national and regional scale UFS numerical forecast improvement and guide year-over-year UFS improvements to national fire weather services
- Implement annual NWS NBM guidance with improvements focused to support improved national fire weather services

FY 2024

- Develop best practices to ensure effective use of next-generation mesoscale analysis system to enable enhanced IDSS communication of the onset of critical and extreme fire weather conditions
- Implement annual upgrade of NWS NBM guidance with improvements focused to support improved national fire weather services

- Develop and implement new fire weather focused metrics for local scales to measure and focus very high resolution UFS numerical forecast improvement

FY 2025

- Implement annual NWS NBM guidance with improvements focused to support improved national fire weather services
- Implement additional fire weather focused metrics for local scales to measure and focus local very high resolution UFS numerical forecast improvement and guide year-over-year UFS improvements to nationwide fire weather services
- Share best practices to ensure effective use of next-generation mesoscale analysis system to enable enhanced IDSS communication of the onset of critical and extreme fire weather conditions
- Evaluation of existing methods to predict conditions supportive of extreme fire danger, fire ignition events, and fire behavior

FY 2026

- Provide improved high resolution guidance on terrain influenced extreme fire weather conditions to support short-range wildfire decision making
- Refine best practices to ensure effective use of next-generation mesoscale analysis system to enable enhanced IDSS communication of the onset of critical and extreme fire weather conditions
- Continue the development and implementation of refined fire weather focused metrics for local scales to measure and focus local very high resolution UFS numerical forecast improvement and guide year-over-year UFS improvements to nationwide fire weather services

Deliverables:

- Post processing techniques for translation of specialized probabilistic fire weather guidance into effective risk estimates
- Improved next generation, nationally consistent NWS fire weather services, that exploit improved UFS numerical models, which is optimized to support fire community and diverse societal needs and critical decision support requirements

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
National Fire Weather Two-Day Forecast Accuracy (Critical Success Index)					
With Increase	0.35	0.35	0.40	0.40	0.45
Without Increase	0.35	0.35	0.35	0.35	0.35
Outyear Costs:					
Direct Obligations	750	750	750	750	750
Capitalized	750	750	750	750	750
Uncapitalized	0	0	0	0	0
Budget Authority	750	750	750	750	750
Outlays	465	465	465	465	465
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Dissemination
Subactivity: Dissemination

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	9,568	9,863	10,077	10,077	0
11.3	Other than full-time permanent	19	19	20	20	0
11.5	Other personnel compensation	352	363	371	371	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	9,939	10,245	10,468	10,468	0
12	Civilian personnel benefits	3,347	3,487	3,874	3,874	0
13	Benefits for former personnel	11	11	12	12	0
21	Travel and transportation of persons	187	189	191	191	0
22	Transportation of things	52	50	52	52	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	3,130	3,324	3,358	3,358	0
23.2	Rental Payments to others	4,772	4,869	5,015	5,015	0
23.3	Communications, utilities and misc charges	22,735	23,235	24,124	24,124	0
24	Printing and reproduction	6	7	7	7	0
25.1	Advisory and assistance services	2,945	3,263	3,293	3,293	0
25.2	Other services from non-Federal sources	24,552	24,556	25,263	26,013	750
25.3	Other goods and services from Federal sources	566	618	625	625	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	2,375	2,419	2,438	2,438	0
31	Equipment	1,379	1,339	1,364	1,364	0
32	Lands and structures	1	1	1	1	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	731	727	740	740	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	3	3	3	3	0
44	Refunds	0	0	0	0	0
99	Total obligations	76,732	78,344	80,828	81,578	750

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Dissemination	Pos./BA	78	80,828	78	81,228	0	400
	FTE/OBL	77	80,828	77	81,228	0	400

Co-Development of Sub-Seasonal to Seasonal (S2S) Decision Support Services to Mitigate the Impacts of Extreme Events and Enable a Resilient Society (+$400, 0 FTE/ 0 Positions) – This increase will provide improved delivery of new products and services and better provide information to vulnerable/underserved communities. For example, extended periods of significantly below normal temperatures can adversely impact crop planting and harvesting schedules. NWS proposes to provide improved delivery of new publicly available products and services which will better provide information to vulnerable and underserved communities. NOAA requests a total $5.3 million to develop S2S (week two to three months) decision support services (DSS) for long lead time extreme events that occur on a timeframe from weeks to months. This initiative also includes $0.9 million for high performance computing for Central Processing [NWS-43], $0.5 million for user engagement surveys and workshops in the Analyze, Forecast, and Support [NWS-76], and $3.5 million for Science and Technology Integration in support of DSS product/service development and training and outreach [NWS-159].

Understanding and predicting extreme events on the subseasonal to seasonal time scale and their impacts has been identified in the *Weather Research and Forecasting Innovation Act of 2017* (P.L. 115-25) and the *National Integrated Drought Information System Reauthorization Act of 2018* (P.L. 115-423) as a top national priority. Decision makers are often faced with a complex array of information including intertwining tasks required to design mitigation strategies for developing responses to high impact environmental events amid greater uncertainty, which is exacerbated by climate change.

NWS will leverage social science to engage stakeholders across multiple sectors (e.g., agricultural, water resources, public health, emergency management, marine resources, and energy sectors), including decision makers in underserved communities such as Tribal governments, inner-city communities, economically disadvantaged rural regions, and other vulnerable populations, in the development of requirements for S2S DSS actionable data/services. Following the iterative engagement with stakeholders and end users to understand user requirements, NWS will engage with Weather/Water/Climate Enterprise partners in assessing how best to

use Enterprise capabilities to meet these requirements. For those areas where NOAA services can best meet user needs, NWS in partnership with the NOAA OAR Labs, will develop specific DSS data/services that meet the requirements identified. As a result, NWS will be better equipped to provide DSS data/services, training and outreach to maximize usability and actionable information in the user communities, and provide a more comprehensive suite of early warning information for enhanced decision-making for stakeholders. This will lead to increased resilience and improved mitigation planning to be better prepared for extreme events such as excessive heat and cold waves, extreme winds, droughts, floods, severe storms, winter storms, and tropical cyclones/hurricanes.

The proposed DSS will provide probabilistic information on the likelihood of extreme S2S climate events and use state of the science methods including ensemble post-processing of dynamical models, artificial intelligence/machine learning (AI/ML) tools, and statistical techniques and hybrid combinations of these different approaches. The product/services will be user-friendly, provide historical skill and confidence levels, and be targeted toward specific decision points for the different sectors (agriculture, water-resources, public health, emergency management, marine-resources and energy). These data/services will allow users to objectively include S2S climate prediction information as part of their decision-making processes, thereby enhancing user preparedness, planning, and resilience. The specific number and types of data/services developed will depend upon results of research on predictive skill limits and social science data gathering. Finally, we will utilize social science to evaluate the impact of these tools to inform refinement of the existing and development of data/services.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

'Schedules and Milestones', 'Deliverables', and 'Performance Measures' reflect the outcomes resulting from all four NWS program increases given the non-severability of these initiatives.

Schedule and Milestones:
FY 2022 - FY 2026

- FY 2022
    - Stakeholder meetings conducted to understand key climate-based impact decisions and how S2S information can inform those decisions

    - NOAA and Weather/Water/Climate Enterprise interactions to assess capabilities/roles in meeting user needs
    - NWS and NOAA labs begin product/service development based on user needs
- FY 2023
    - Prototype sectoral specific DSS co-developed and tested with stakeholders
- FY 2024
    - Evaluation of prototype sectoral specific DSS
    - Operationalization of 4 prototype DSS data/services
- FY 2025
    - Stakeholder meetings conducted to scope improvements to first-generation data/services supporting sectoral specific decision-making
    - NWS and NOAA labs begin work on second generation DSS data/services Operationalization of 4 additional prototype DSS data/services
- FY 2026
    - Co-development and testing of second generation sectoral specific DSS

Deliverables:

- Documentation of user needs for sectoral specific DSS
- Plan for providing DSS to underserved user communities developed and executed
- Operational DSS for agriculture, water resources, public health, emergency management, marine resources, and energy communities
- Objectively evaluated predictive skill limits and confidence levels for S2S extreme climate events including heat and cold waves, droughts, floods, severe and fire weather, ocean heat waves, and tropical cyclones/hurricanes
- Evaluation of the impact of sectoral specific DSS

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of Sectoral-Specific DSS (cumulative)					
With Increase	0	0	4	4	8
Without Increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	400	400	400	400	400
Capitalized	400	400	400	400	400
Uncapitalized	0	0	0	0	0
Budget Authority	400	400	400	400	400
Outlays	248	248	248	248	248
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Dissemination
Subactivity: Dissemination

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	9,568	9,863	10,077	10,077	0
11.3	Other than full-time permanent	19	19	20	20	0
11.5	Other personnel compensation	352	363	371	371	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	9,939	10,245	10,468	10,468	0
12	Civilian personnel benefits	3,347	3,487	3,874	3,874	0
13	Benefits for former personnel	11	11	12	12	0
21	Travel and transportation of persons	187	189	191	191	0
22	Transportation of things	52	50	52	52	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	3,130	3,324	3,358	3,358	0
23.2	Rental Payments to others	4,772	4,869	5,015	5,015	0
23.3	Communications, utilities and misc charges	22,735	23,235	24,124	24,124	0
24	Printing and reproduction	6	7	7	7	0
25.1	Advisory and assistance services	2,945	3,263	3,293	3,293	0
25.2	Other services from non-Federal sources	24,552	24,556	25,263	25,663	400
25.3	Other goods and services from Federal sources	566	618	625	625	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	2,375	2,419	2,438	2,438	0
31	Equipment	1,379	1,339	1,364	1,364	0
32	Lands and structures	1	1	1	1	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	731	727	740	740	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	3	3	3	3	0
44	Refunds	0	0	0	0	0
99	Total obligations	76,732	78,344	80,828	81,228	400

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Dissemination	Pos./BA	78	80,828	78	92,228	0	11,400
	FTE/OBL	77	80,828	77	92,228	0	11,400

Enterprise Infrastructure Solutions (EIS) (+$11,400, 0 FTE/ 0 Positions) – This increase will enable NOAA to conduct a technology modernization and support an accelerated transition of telecommunications services to the GSA EIS contract vehicle. DOC currently uses GSA's Networx, Washington Interagency Telecommunications System 3, and regional contracts to acquire telecommunication services. These contracts expire in May 2023. Between now and then, DOC will be transitioning telecommunications services to the GSA EIS follow-on contract. The total NWS request for this initiative is $12.6 million, which includes $11.4 million in Dissemination ORF, $0.75 million in Observations ORF [NWS-24], and $0.47 million in Observations PAC [NWS-182]. Additional NOAA EIS requests can also be found in Mission Support [MS-66], NOS [NOS-48; NOS-88; NOS-120; NOS-149], NMFS [NMFS-70], NESDIS [NESDIS-37], and OMAO [OMAO-19].

Specifically, this request focuses on EIS for NOAA Weather Radio (NWR), surface observing (ASOS) and radar (NEXRAD) circuits. NWS is required to transition all circuits provisioned by the Dissemination and Observation portfolios to facilitate these communications, necessitating the purchase of new hardware. There will be costs for trenching and laying these new lines, procurement, and implementation of network hubs to allow communications on NWS networks between the legacy vendors and the new vendor circuits during the transition period. NWS also requires support services to facilitate the architecture and installations throughout the transition. NWS anticipates it will take up to 5 years to transition all circuits to the new contract.

If NWS does not move to quickly transition to EIS before the expiration of the Networx contract, there are two risks:

1) Circuits will be disconnected by the vendor placing mission operations at risk
2) The incumbent Networx vendor will move the circuit to a month-to-month commercial circuit, which could double or triple the cost, depending on the location and technology. These levels are not affordable within the program.

The modernization enables NOAA to re-architect its network infrastructure to gain efficiencies and resilience, realize significantly reduced costs for network services after transition, and minimize risk as legacy services are discontinued. Increased funding will accelerate the transition and enable NOAA to: (a) contract for engineering services to re-architect the network infrastructure and

establish detailed transition plans; (b) issue awards for new hardware and telecommunication services; (c) trench and lay new lines, decommission and provision circuits; and (d) establish funding for administrative services to provide ordering, invoice processing, and inventory management. By expediting the technology modernization and migration to the new EIS vendors, NOAA will realize significant reductions in price and cost-avoidance. This funding will reduce risks related to service delivery and operations due to termination of GSA legacy service contracts.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

'Schedules and Milestones', 'Deliverables', and 'Performance Measures' reflect the outcomes resulting from all three NWS program increases given the non-severability of these initiatives.

Schedule and Milestones:

FY 2022

- Establish contractual services for the required level of support to plan and engineer the transition
- Award NOAA task orders under EIS to support modernization needs
- Establish a sustainable, resilient architecture to meet NWS's current and planned needs
- Begin transition of NWS Legacy GSA inventory to EIS
- Transition 86 ASOS SLEP sites
- Procure 500 NWR IP circuits
- Transition 237 NWR sites
- Transition 10 One NWSNet sites
- Establish 2 hubs for legacy and new circuits to communicate
- Transition 53 NEXRAD landlines

FY 2023

- Transition 53 NEXRAD landlines
- Transition 4 NEXRAD VSATs
- Transition 10 NEXRAD 4G sites
- Transition 300 ASOS SLEP sites
- Procure 400 NWR IP circuits
- Transition 237 NWR sites
- Transition 60 One NWSNet sites

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- Establish 10 hubs for legacy and new circuits to communicate
- Maintain and support transitioned NWR lines and circuits

FY 2024

- Transition 53 NEXRAD landlines
- Transition 12 NEXRAD VSATs
- Transition 50 NEXRAD 4G sites
- Transition 199 ASOS SLEP sites
- Transition 237 NWR circuits
- Transition 60 NWSNet sites
- Maintain 12 hubs for legacy and new circuits to communicate
- Maintain and support transitioned NWR lines and circuits

FY 2025

- Transition 53 NEXRAD landlines
- Transition 12 NEXRAD VSATs
- Transition 50 NEXRAD 4G sites
- Transition 100 ASOS SLEP sites
- Transition 237 NWR circuits
- Transition 60 NWSNet sites
- Decrease hubs to 5 for legacy and new circuits to communicate
- Maintain and support transitioned NWR lines and circuits

FY 2026

- Transition 53 NEXRAD landlines
- Transition 12 NEXRAD VSATs
- Transition 50 NEXRAD 4G sites
- Transition 60 NWSNet sites
- Maintain 5 hubs for legacy and new circuits to communicate
- Maintain and support all NWR lines and circuits

Deliverables:

- Modernized telecommunications infrastructure capable of meeting the agency's mission
- Provide a centralized ordering and management platform
- Provide a secure infrastructure resistant to extreme weather impacts

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Performance Measures	2022	2023	2024	2025	2026
Percentage of circuits transitioned to the new EIS contract					
With Increase	15	40	65	90	100
Without Increase	0	10	20	30	40

Outyear Costs:					
Direct Obligations	11,400	11,400	11,400	11,400	11,400
Capitalized	4700	4700	4700	4700	4700
Uncapitalized	6700	6700	6700	6700	6700
Budget Authority	11,400	11,400	11,400	11,400	11,400
Outlays	7,068	7,068	7,068	7,068	7,068
FTE	0	0	0	0	0
Positions	0	0	0	0	0

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Dissemination
Subactivity: Dissemination

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	9,568	9,863	10,077	10,077	0
11.3	Other than full-time permanent	19	19	20	20	0
11.5	Other personnel compensation	352	363	371	371	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	9,939	10,245	10,468	10,468	0
12	Civilian personnel benefits	3,347	3,487	3,874	3,874	0
13	Benefits for former personnel	11	11	12	12	0
21	Travel and transportation of persons	187	189	191	191	0
22	Transportation of things	52	50	52	52	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	3,130	3,324	3,358	3,358	0
23.2	Rental Payments to others	4,772	4,869	5,015	5,015	0
23.3	Communications, utilities and misc charges	22,735	23,235	24,124	30,824	6,700
24	Printing and reproduction	6	7	7	7	0
25.1	Advisory and assistance services	2,945	3,263	3,293	3,293	0
25.2	Other services from non-Federal sources	24,552	24,556	25,263	26,263	1,000
25.3	Other goods and services from Federal sources	566	618	625	625	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	2,375	2,419	2,438	6,138	3,700
31	Equipment	1,379	1,339	1,364	1,364	0
32	Lands and structures	1	1	1	1	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	731	727	740	740	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	3	3	3	3	0
44	Refunds	0	0	0	0	0
99	Total obligations	76,732	78,344	80,828	92,228	11,400

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		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Dissemination	Pos./BA	78	80,828	78	84,328	0	3,500
	FTE/OBL	77	80,828	77	84,328	0	3,500

Expand and Enhance NWS Services to Vulnerable/Underserved Communities for Extreme Events: Dissemination Enhancements (+$3,500, 0 FTE/ 0 Positions) – This request will improve the dissemination of weather information to vulnerable/underserved communities in both urban and rural geographies.

Many communities in the U.S. lack the telecommunications bandwidth and other means to fully access the suite of NOAA/NWS environmental information and decision support services. NWS proposes developing a preliminary program in partnership with other federal agencies and industries to expand communication through mobile technologies, low-bandwidth technologies, and social media since many of these communities rely on these communication channels more so than the general population. This also includes improving communications with remote, indigenous populations via NOAA Weather Radio, Satellite, and other culturally-aligned communication methods.

The NWS will focus on the following areas:

- Upgrade the mobile.weather.gov website, making it more robust and reliable, providing useful mobile access to weather forecasts, watches, warnings and low bandwidth radar. NWS will also provide mobile.weather.gov in Spanish, though this is dependent on Central Processing receiving funding in their request titled Improve Service Delivery [NWS-48]. The site will also be more reliable simply through migration to the NWS private or public cloud with 24x7 support. Additionally NWS will support the WFOs in implementing Spanish translation on their websites.
- Create standardizations for social media posts as social media is another platform easily accessible from mobile devices and through lower bandwidths. NWS will ensure the guidance on posts for the regions and WFOs is clear in order to make them easily understood and consistent when severe weather is forecast or ongoing, and will provide for the posts to be made available in both English and Spanish.

- Perform analysis of the use of NWR as a form of reaching rural areas, especially those of indigenous people. Already, NWR is the most reliable method of reaching rural areas with weather forecasts, watches and warnings. The analysis would gather data on ways to improve that reach, whether it is a lack of availability of NOAA weather radio units, placement of NWR towers, or another unknown that is preventing people from receiving these broadcasts.

Schedule and Milestones:

FY 2022
- Gather requirements for mobile.weather.gov upgrade
- Begin drafting guidance on social media posts during critical weather

FY 2023
- Begin mobile.weather.gov upgrade
- Enable mobile.weather.gov translation in Spanish as part of application upgrade
- Finalize and publish guidance on social media posts during critical weather
- Begin analysis of NWR accessibility and use in rural areas
- Meet with partners to discuss low bandwidth technologies to reach rural areas

FY 2024
- Complete mobile.weather.gov upgrade
- Complete mobile.weather.gov translation in Spanish
- Migrate upgraded mobile website to IDP or public cloud and make it operational
- Continue analysis of NWR accessibility and use in rural areas
- Work with partners agencies on low bandwidth solutions
- Evaluate preliminary program with partner agencies

FY 2025
- Maintain upgraded mobile.weather.gov
- Review and revise as necessary guidance on social media posts during critical weather
- Continue analysis of NWR accessibility and use in rural areas
- Begin to draft plans to increase accessibility to NWR based on analysis
- Work with partners agencies on low bandwidth solutions

FY 2026
- Maintain upgraded mobile.weather.gov
- Review and revise as necessary guidance on social media posts during critical weather

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- Finalize commendation to increase accessibility to NWR based on analysis
- Work with partners agencies on low bandwidth solutions

Deliverables:

- Improved mobile.weather.gov site hosted on the private or public cloud
- Published guidance on Social Media Posts
- A formal recommendation regarding enhancements to the NWR program to improve access in rural areas

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Performance Measures	2022	2023	2024	2025	2026
Number of monthly hits on Mobile.weather.gov (in millions)					
With Increase	15	15	30	45	60
Without Increase	15	15	15	15	15
Number of NWS Offices with Spanish Translation Available Online					
With Increase	2	8	24	40	56
Without Increase	1	2	5	7	7
Outyear Costs:					
Direct Obligations	3,500	3,500	3,500	3,500	3,500
Capitalized	3,500	3,500	3,500	3,500	3,500
Uncapitalized	0	0	0	0	0
Budget Authority	3,500	3,500	3,500	3,500	3,500
Outlays	2,170	2,170	2,170	2,170	2,170

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FTE	0	0	0	0	0
Positions	0	0	0	0	0

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Dissemination
Subactivity: Dissemination

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	9,568	9,863	10,077	10,077	0
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11.5	Other personnel compensation	352	363	371	371	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	9,939	10,245	10,468	10,468	0
12	Civilian personnel benefits	3,347	3,487	3,874	3,874	0
13	Benefits for former personnel	11	11	12	12	0
21	Travel and transportation of persons	187	189	191	191	0
22	Transportation of things	52	50	52	52	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	3,130	3,324	3,358	3,358	0
23.2	Rental Payments to others	4,772	4,869	5,015	5,015	0
23.3	Communications, utilities and misc charges	22,735	23,235	24,124	24,124	0
24	Printing and reproduction	6	7	7	7	0
25.1	Advisory and assistance services	2,945	3,263	3,293	3,293	0
25.2	Other services from non-Federal sources	24,552	24,556	25,263	28,763	3,500
25.3	Other goods and services from Federal sources	566	618	625	625	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	2,375	2,419	2,438	2,438	0
31	Equipment	1,379	1,339	1,364	1,364	0
32	Lands and structures	1	1	1	1	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	731	727	740	740	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	3	3	3	3	0
44	Refunds	0	0	0	0	0
99	Total obligations	76,732	78,344	80,828	84,328	3,500

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Activity: Science and Technology Integration
Subactivity: Science and Technology Integration

Goal Statement

NWS improves the overall quality of the environmental information needed to safeguard life and livelihoods by integrating new science and technology into its operations. Funding in NWS' STI Subactivity leverages the entire weather enterprise including users, research communities, partner agencies, and industry, to provide improved weather forecast guidance for the Nation in support of the Department of Commerce 2018-2022 Strategic Plan, Strategic Objective 3.3 Reduce Extreme Weather Impacts.

Base Program

STI engages partners in outreach efforts, supporting targeted research and development efforts, improving a suite of forecast guidance models and post-processing, continuously training the workforce on scientific advances, and infusing new science into operations. Transition of new research into operations (R2O) is a fundamental activity of this portfolio. NWS identifies and transfers new science concepts and techniques to improved operational warning, forecast, and decision support services, thus enabling the NWS vision to build a Weather-Ready Nation through improved products and services.

In 2021, NWS implemented the National Blend of Models (NBM) Version 4.0; Finite-Volume Cubed Sphere Dynamical Core (FV3)-based operational Global Forecast System (GFS) Version 16 High Resolution Ensemble Forecast (HREF) v3; Nearshore Wave Prediction System (NWPS) v1.3; Real-Time Ocean Forecast System (RTOFS) v2; Rapid Refresh (RAP)/High Resolution Rapid Refresh (HRRR) v4; National Water Model (NWM) 2.1; and the Community Multiscale Air Quality (CMAQ) v6 Model; In 2022, NWS will be implementing the Hybrid Single Particle Lagrangian Integrated Trajectory (HYSPLIT) v8 Model.

Statement of Operating Objectives

Schedule and Milestones:
FY 2022-2026

- Conduct testing, demonstration and validation of new science and service capabilities through testbeds and proving grounds
- Implement regional, global, hurricane and air quality model upgrades routinely
- Improve weather model and post processing guidance

- Update product suite based on customer requirements
- Demonstrate high resolution large watershed modeling with nested hyper-resolution modeling over three regional areas
- Annual upgrade of National Blend of Models

FY 2022

- Implement update to the Hybrid Single Particle Lagrangian Integrated Trajectory (HYSPLIT v8) air quality model
- Implement update to Nearshore Wave Prediction System (NWPS) v1.4
- Implement update to Great Lakes Wave Unstructured (GLWU) v1.4 system
- Implement National Blend of Models version 5.0
- Conduct real-time demonstration of the COASTAL Act CONOPS for both the sensor deployment phase and post-storm assessment phase.
- Develop Publish the UFS Land Modeling Strategy
- Develop and RRFS-CMAQ prototype for coupling meteorology and atmospheric composition
- Develop a five year plan for operational implementation
- Develop and test weakly coupled DA prototype

FY 2023

- Replace the High-Resolution Rapid Refresh (HRRR) with the new regional short-range forecast system: Rapid Refresh Forecast System (RRFS) v1
- Implement Version 4.0 of the National Water Model (NWM v4)
- Implement new Hurricane Analysis and Forecast System (HAFS v2)
- Implement update to global RTOFS v3
- Implement update to Global Ocean Data Assimilation System (GODAS) v3
- Implement the Named Storm Event Mode (NSEM) v1 and the Coastal Wind and Water Event Database (CWWED) v1
- Production of 30 year higher resolution, ensemble-based coupled reanalysis and reforecast.
- Development of SFS Vv1 prototype
- Public release of MRW/S2S (global coupled) application
- Develop the UFS Coastal Modeling Strategy

FY 2024

- Implement unified Global Coupled Ensemble Forecast System version 13/Global Forecast System version 17
- Implement update to RRFS v2
- Implement update to Hurricane Analysis and Forecast System (HAFS v3)
- Demonstrate operational probability-based forecasts of high impact weather for extended ranges (weeks 3 and 4)

- Implement update to the Named Storm Event Mode (NSEM v2) and the Coastal Wind and Water Event Database (CWWED v2)
- Implement update to 3 Dimensional Real Time Mesoscale Analysis (3DRTMA)/Unrestricted Mesoscale Analysis (URMA) v3

FY 2025

- Implement decision support tools for week 3-4 precipitation forecasts targeted toward water resource managers
- Implement operational high resolution large watershed modeling with nested hyper-resolution capability in at least five regional areas
- Implement Global Ensemble Forecast System v14/Global Forecast System v18
- Implement update to HAFS v3
- Implement new Seasonal Forecast System version 1, as an extension of the GEFS v13/GFS v17 system
- Implement update to Whole Atmosphere Model (WAM) v2 for space weather forecasts

FY 2026

- Implement RRFS v3
- Implement updates to unified GEFS/GFS/SFS to include land and ecosystem components
- Implement update to Hurricane Analysis and Forecast System (HAFS v4)
- Prototype unification of regional and hurricane regional systems

Deliverables:

- Upgrades to global operational atmospheric prediction system
- Annual upgrades to operational NOAA Hurricane Forecast System
- Annual enhancement and release of UFS modeling infrastructure (ESMF, CCPP, and METplus)
- Upgrades to the operational regional forecast systems
- Probabilistic hydrologic forecasts for assessing river level and flood risks
- Continuous improvements to NOAA's suite of operational forecast models
- Regular release of operational forecast systems to the community through the Unified Forecast System
- New and improved modeling techniques, evaluated by the Developmental Testing Center, and delivered to NWS, for incorporation in the Operational Modeling Suite
- Increased horizontal and vertical resolution of atmosphere, ocean, sea ice, waves, land, within bounds of computational capability
- Upgrades to operational Data Assimilation System, toward JEDI-based coupled Data Assimilation system
- Annual upgrades to the NOAA Environmental Modeling System infrastructure

- Upgraded ocean, atmosphere, sea ice, land surface, aerosol, wave component models
- Agile HPC environment with quicker operational transition of research and development efforts
- Upgraded operational storm surge warning service products (e.g., inundation maps)
- Upgraded probabilistic storm surge guidance
- Operational weekly, monthly and seasonal sea ice outlook guidance products for Arctic Ocean
- Forecaster applications (tools, methodologies, datasets) of near real-time data products from research ocean remote sensing satellites
- Week-2, 3 & 4 to seasonal outlook tools/products for local decision support services
- New NWS experimental products focused on extreme events
- Global operational coupled atmosphere-ocean-land-wave-sea ice prediction system extending today's operational weather outlooks from 16 days out to one year
- Improved forecasts provided to the Nation's critical infrastructure to ensure lives and property are protected from the effects of space weather
- Evaluation of NWS testing/demonstration plans and results
- Improved public access to Federal water information
- Implement an advanced hind cast modeling capability, the Named Storm Event Model, at NOAA to produce detailed "post-storm assessments" to indicate the strength and timing of damaging winds and water at a given location in the area impacted by a tropical cyclone.
- Implement a Coastal Wind and Water Event Database to provide the public access to observations collected during the storm and the post-storm assessments.
- Atmospheric, coastal, and terrestrial modeling components integrated into the community WRF-Hydro Earth system modeling framework
- Upgraded ozone and particulate prediction system
- Establish probabilistic precipitation services
  - A new UFS Seasonal Forecast System

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JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Explanation and Justification

		2020 Actual		2021 Enacted		2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Science and Technology Integration	Pos/BA	418	146,797	427	153,499	427	158,309
	FTE/OBL	416	163,183	421	153,499	421	158,309

In support of NOAA's operational forecasting mission, NWS researches and develops, improves, and monitors data assimilation systems and models of the atmosphere and oceans using advanced methods developed internally, as well as cooperatively with scientists from universities, NOAA laboratories, other government agencies, and the international scientific community.

STI maintains the following programs to accomplish this activity:

Weather-Ready Nation (WRN) is a nationwide initiative to build community resilience in the face of increasing vulnerability to extreme weather, water, and climate events. WRN empowers emergency managers, first responders, government officials, businesses, and the public to make faster, smarter decisions to save lives and protect livelihoods. Key actions that enable implementation of the WRN roadmap include the following:

- Develop, transition, and improve advanced forecast tools, techniques, service products and next generation warning and forecast paradigms to enhance NWS' national, regional and local warning, forecast, and guidance services.
- Incorporate and integrate social science into the forecasting process to develop more effective decision support capabilities, improving the effectiveness of warnings and forecasts, and to better convey forecast risk and uncertainty.
- Develop high-resolution probabilistic weather information consistent across space and time to support safe air traffic operations.
- Extend warning and forecast lead times for tornado, hurricane, storm surge, fire weather, and winter storms with increased certainty and confidence. Develop/improve models, tools, and data sets to forecast and monitor real-time climate variations.
- Improve space weather warnings and forecasts for geomagnetic and radiation storms and ionospheric disturbances to protect the reliability and resilience of the Nation's electric power system, satellite navigation, and telecommunication infrastructure, and support aviation and space flight safety.

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Operational Environmental Prediction Modeling Suite is the foundation for all warning, forecast and decision support services. The Environmental Modeling Center (EMC) develops, enhances, and maintains complex software of numerical weather, ocean, climate, sea ice, and coastal prediction models and data assimilation systems that span the globe. These forecast systems underpin all NOAA forecast capabilities. The operational modeling suite provides the basic numerical guidance that NWS forecasters rely on in making forecasts, warnings, and decision support service products.

- EMC collaborates with partners at universities and research laboratories to integrate advancements of environmental prediction modeling research and development into NWS operational models.
- EMC also collaborates with partners within NOAA and with other Federal agencies to conduct studies to validate observing requirements and data impacts for existing and new observing platforms and technologies such as satellites and radar.

Improving Effectiveness of Warning and Forecasts aims to accelerate the transition of advanced modeling research into operations. This program is focused on improving warning and forecast lead-times and accuracy of severe weather events associated with hurricanes, tornadoes, flash floods and other severe weather hazards. Major efforts include:

- Improving the accuracy and reliability of hurricane track and intensity forecasts, through the Hurricane Forecast Improvement Project (HFIP), as required by the *Weather Research and Forecasting Innovation Act of 2017* (P.L. 115-25), to reduce unnecessary evacuations. This effort also focuses on advanced data assimilation and improved global atmospheric and ocean models, which underpin forecast systems for all severe weather.
- Providing the Next Generation Global Prediction System (NGGPS) to the research community, including necessary infrastructure to facilitate engagement and improvements from community collaborators. NGGPS forms the backbone of NOAA's future operational numerical weather prediction capability meeting the public's evolving needs for more accurate, more specific, and longer lead time weather forecasts. NGGPS provides significant advancements for warning and forecast skill across multiple service areas.
- Developing and evaluating national air quality forecast models to provide national pollutant forecast information for states, local communities, commercial sectors, the U.S. Environmental Protection Agency, and the U.S. Department of State.
- Extending forecast of extreme and high impact weather to four weeks through the development of improved outlooks and transitioning into modeling operations of advancements in prediction science coming from the scientific research community. Extending foundational forecasts of subseasonal and seasonal temperature and precipitation is a key requirement of the *Weather Research and Forecasting Innovation Act of 2017*.
- Unifying NOAA's operational model suite based on FV3 atmospheric Dynamic Core, with coupling to the MOM6 ocean model.

Hydrology and Water Resource Programs leverage NOAA partnerships in the areas of atmosphere, watersheds, estuaries and oceans to improve and integrate water resource prediction modeling capabilities. NWS' Hydrology Laboratory conducts studies, investigations and analyses, leading to the application of new scientific and computer technologies to hydrologic forecasting and related water resources problems.

- NWS transitions research in atmosphere, watershed, estuary and ocean modeling, and data assimilation science and technology into operational hydrologic and water resource forecast capabilities in order to provide integrated decision support tools that offer a seamless suite of summit-to-sea forecasts.
- Through partnerships, especially the IWRSS Consortium, NWS is developing a new suite of high-resolution forecasts of streamflow, soil moisture, soil temperature and other variables directly related to watershed conditions to enable monitoring and forecasting of hydrologic conditions from floods to droughts.

Training Infrastructure is critical to preparing the current and future workforce for WRN. Effective training leads to better integration of new models, transition of science and technology into operations, and improved service to the Nation. The NWS workforce must remain agile and flexible to meet core partner needs. NWS uses a blended learning approach including online courses, webinars, and residence training. Implementation of these training initiatives requires new and enhanced methods and technologies for training delivery, such as simulations and on-demand training, integrated into applications and other systems. As a part of this effort:

- NWS identifies and addresses local training needs, facilitates professional development, and addresses individual strengths and weaknesses of the local forecast staff.
- NWS ensures local operations and management teams are fully proficient and knowledgeable in protocols, tools, forecast and warning operations for delivery of effective IDSS.

Improve Operational Forecast Products and Services through a continuous infusion of science and technology. This is critical for improving services and ensuring the current and future workforce is prepared to meet the requirements of a WRN. These actions include:

- Centrally manage national and regional implementation of research to operations transitions at the local level including applications that improve model guidance;
- Maintain local science and training expertise through the Science and Operations Officers and the Development and Operations Hydrologists to lead coordinated improvements of operations through adopting new science and technology by the forecasting staff, and addressing local forecast and warning issues;
- Maintain close connections with the research community to enable, and accelerate, research to operations, including sponsoring the Collaborative Science and Technology Applied Research program, supporting testbeds, and supporting

visiting scientists programs, a priority of the *Weather Research and Forecasting Innovation Act of 2017* (P.L. 115- 25), to improve NWS services;

- Enhance testbeds and operational proving grounds; and,
- Provide operational platforms for the broad research and development community across NOAA, academia, core partners, and the weather enterprise to conduct demonstration, simulation, verification, and validation of new science and service capabilities.

Without continued support for WRN, the Operational Environmental Prediction Modeling Suite, Hydrology and Water Resource Programs and this training infrastructure, provided for in STI ORF, NWS cannot continue to support research and research-to-operations activities that advance weather and climate prediction and improve NWS products and information in the future.

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(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Science Technology Integration	Pos./BA	427	158,309	436	173,309	9	15,000
	FTE/OBL	421	158,309	428	173,309	7	15,000

Seasonal Forecast System (SFS v1) (+$15,000, 7 FTE/ 9 Positions) – NOAA requests an increase to establish a Seasonal Forecast System (SFS) forecast capability to improve the skill, lead time, and breadth of weather and environmental prediction.

Currently NWS lacks the capability to accurately predict and communicate the probability of extreme disruptive weather events in months to one year, or seasonal time frame. This SFS model will enable NWS to provide critical long range predictions for: water resources including flood and drought; storm severity and frequency; hurricane intensity and frequency; marine heat waves; extreme heat or cold wave; extreme winds; fire severity and danger; and other environmental factors, nationally and globally. Key decision makers such as water managers, emergency managers, energy producers, farmers, military leaders and other sectors will benefit from being able to make informed long lead time decisions which have significant impact on the U.S. gross domestic product, economic vitality and national security.

The SFS model, with capabilities at the frontiers of predictive skill, “fills the gap” between shorter range weather forecast and longer term climate change simulations/projections. This SFS capability will make significant progress towards seamless prediction, with consistent treatment of weather, water and climate in a single modeling system. This request responds to mandates in the *National Integrated Drought Information System Reauthorization Act of 2018* (P.L. 115-423) and the *Weather Research and Forecasting Innovation Act of 2017* (P.L. 115-25).

The SFS builds upon and extends the capabilities of the NOAA Global Ensemble Forecast System weather model, currently in development, which already contains components describing the atmosphere, oceans, land and cryosphere. Accurate SFS requires better physics descriptions of slowly changing processes on the land, in the oceans, for ice, and for atmospheric chemistry. Models must adequately capture the initial states of the atmosphere, ocean, land surface and cryosphere, as well as the interactions, or coupling, of these different components. Significant development in land vegetation and groundwater, sea-ice growth and melt, ocean mixing, and atmospheric ozone model components is critical. Data assimilation improvements for the land, ocean and sea ice

states are needed in order to more accurately represent the initial states of those model components that provide the long-term memory of the Earth System. A historical reanalysis and reforecast for multi-decades is needed for model calibration and to further improve seasonal forecast outlooks along with post-processing methods including machine learning. Longer lead time SFS predictions, and the extensive reanalysis-reforecast make the representation of uncertainty and the verification process more challenging and more computationally intensive than current weather forecasts. Forecast products to meet the highest priorities of forecasters and stakeholders will be developed initially.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:

FY 2022 – FY 2026
FY 2022
- Data requirements established requirements for historic reanalysis and reforecast/scope of the project

FY 2023
- Development of a SFS prototype that runs for multiple decades

FY 2024
- Public release of SFS coupled system, including Land model v1
- Forecast product beta versions
- First 2 prototype SFS versions conducted
- Coupled data assimilation system developed

FY 2025
- Extend multi-decadal reanalysis-reforecasts
- SFS prototype 3-4 conducted

FY 2026
- SFS v1 (FY 2026), will replace the 15-year old Climate Forecast System (CFS v2)

Deliverables:
- Public release of coupled SFS system, including new Land model v1 (FY 2024)
- Reanalysis-reforecast release to the community (FY 2025)
- SFS v1 will replace the 15-year old Climate Forecast System (CFS v2) (FY 2026)

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Hiedke Skill Score for 2m temperature (percentage)					
With Increase	27	27	28	28	32
Without Increase	27	27	28	28	28
Nino3.4 SST (six month anomaly correlation coefficient, 1 is perfect)					
With Increase	0.77	0.77	0.77	0.77	0.87
Without Increase	0.77	0.77	0.77	0.77	0.77
Madden-Julian Oscillation (MJO) (days)					
With Increase	22	22	22	22	26
Without Increase	22	22	22	22	22
Outyear Costs:					
Direct Obligations	15,000	15,000	15,000	15,000	15,000
Capitalized	11,875	11,875	11,875	11,875	11,875
Uncapitalized	3,125	3,125	3,125	3,125	3,125

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Budget Authority	15,000	15,000	15,000	15,000	15,000
Outlays	9,300	9,300	9,300	9,300	9,300
FTE	7	9	9	9	9
Positions	9	9	9	9	9

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Science and Technology Integration
Subactivity: Science and Technology Integration
Program Change: Seasonal Forecast System (SFS v1)

Title		Grade	Number	Annual Salary	Total Salaries
Physical Scientist (Supervisory)		GS-14	2	138,866	277,732
Physical Scientist		GS-13	3	117,516	352,548
Physical Scientist		ZP-IV	4	123,067	492,268
Total			9		1,122,548
Less lapse	25.00%		(2)		(280,637)
Total full-time permanent (FTE)			7		841,911
2022 Pay Adjustment (2.7%)					22,732
					864,643

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	7
Total FTE	7
Authorized Positions:	
Full-time permanent	9
Total Positions	9

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Science and Technology Integration
Subactivity: Science and Technology Integration

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	53,961	55,441	56,687	57,552	865
11.3	Other than full-time permanent	120	123	126	126	0
11.5	Other personnel compensation	1,704	1,748	1,788	1,788	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	55,785	57,312	58,601	59,466	865
12	Civilian personnel benefits	20,519	21,291	23,804	24,063	259
13	Benefits for former personnel	25	26	29	29	0
21	Travel and transportation of persons	731	645	653	653	0
22	Transportation of things	221	191	194	194	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	6,034	6,324	6,412	6,412	0
23.2	Rental Payments to others	66	68	70	70	0
23.3	Communications, utilities and misc charges	948	990	1,012	1,012	0
24	Printing and reproduction	38	35	35	35	0
25.1	Advisory and assistance services	31,691	22,082	22,406	22,406	0
25.2	Other services from non-Federal sources	13,877	10,300	10,344	13,844	3,500
25.3	Other goods and services from Federal sources	3,053	2,694	2,734	2,734	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	3	2	2	4,502	4,500
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,518	1,550	1,528	1,528	0
31	Equipment	647	555	561	4,437	3,876
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	28,024	29,430	29,922	31,922	2,000
42	Insurance claims and indemnities	1	0	0	0	0
43	Interest and dividends	3	3	2	2	0
44	Refunds	0	0	0	0	0
99	Total obligations	163,183	153,499	158,309	173,309	15,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Science Technology Integration	Pos./BA	427	158,309	429	160,309	2	2,000
	FTE/OBL	421	158,309	423	160,309	2	2,000

Seamless Weather to Climate Fire Weather Predictions to Improve Resilience and Disaster Mitigation (+$2,000, 2 FTE/ 2 Positions) – This increase will improve fire weather forecasts and warning services through the development of probabilistic numerical models that are optimized for the fire community, post processing techniques, and decision support services (DSS) tools within an interagency fire weather testbed. The total NWS request for this initiative is $4.0 million, to also include $0.75 million in Central Processing [NWS-37], $0.5 million in Analyze, Forecast, and Support [NWS-69], and $0.75 million in Dissemination [NWS-116].

The 2020 fire season was a record-setting one for the state of California and the United States as a whole. By November 2020, the National Interagency Fire Center reported that there were 52,113 wildfires that had burned 8,889,297 acres in 2020 - approximately 2.3 million more acres burned than the 10-year average and almost double the acreage burned in the 2019 season. Losses from wildfires over the last decade resulted in over $5 billion in damage. Annually, wildfires kill 30 people and destroy over 2,800 homes. Furthermore, non-local air quality and health impacts from wildfires are felt across the nation due to the advection of smoke and emissions. This project aims to reduce the devastating impacts of future wildfires by providing NWS Incident Meteorologists (IMETs), state and local fire control, the forest service, and other federal agencies with DSS tools to prevent and fight increased wildfire activity.

Since weather conditions impact how fires start and how they move, this project will result in improved DSS tools through the use of innovative science and technology improvements, including the development and use of probabilistic model ensembles, in better interpreting meteorological conditions, assessing their effects, and communicating that information to fire crews and incident command teams. These tools will enable continuous support for the duration of fire weather incidents, providing IMETs and incident command teams with scenarios for which fires will move and evolve for the duration of an event, in preventing loss of life and

property. Through this work, a new NOAA Fire Weather Testbed resourced by NOAA OAR will be established, facilitating close coordination between NWS, other Federal agencies, state and local fire control, the forecast service, emergency managers, and other NOAA line offices through the NOAA Weather, Water, Climate Council.

This project proposes the development and implementation of a comprehensive, integrated, seamless suite of prediction and DSS tools for fire weather on timescales from hours to sub-seasonal and spatial scales from local to national. Scientists from NWS and the NOAA Labs will work with NWS fire weather experts, US Forest Service partners, and relevant Tribal organizations to develop ensemble-based probabilistic prediction tools utilizing the NOAA Unified Forecast System (UFS) and multi-model ensembles. The goal of the project is to provide wildland fire managers with more accurate predictions at longer lead times; predictions that will include robust uncertainty estimates and cascading information to allow nuanced high-tempo decisions during fire weather events thereby increasing their ability to effectively plan for and respond to wildfires.

NWS will enhance the fire weather warning program through improved methods for predicting extreme fire danger, including use of probabilistic guidance, and better messaging of impact-based decision support. Leveraging the NOAA testbed resourced through NOAA OAR, testbed activities will be conducted with the fire community, focused on evaluating diverse methods of predicting and communicating conditions supportive of extreme fire danger and fire behavior. NWS will invest in a robust suite of fire weather numerical model post processing including specialized probabilistic fire weather guidance to improve NWS fire weather forecasts, warnings and impact-based decision support services. NWS will also strengthen research-to-operations partnerships with both NOAA's OAR, university researchers, and the broader inter-agency fire weather community through effective fire weather focused testbed engagements. The NWS will focus improvements in numerical model forecasts of fire weather critical conditions, including the effects of complex terrain, in coordination with the UFS and Earth Prediction Innovation Center. Probabilistic prediction of fire weather conditions will be incorporated into UFS numerical models focusing on both local (Rapid Refresh Forecast System or RRFS) and national (Global Ensemble Forecast System or GEFS) scales, beginning with improving NWS objective measures of success for fire weather that will translate into improved services for society including underserved and vulnerable populations.

The critical success index, also known as the threat score, will be used to measure the effectiveness of the proposed DSS tools and improvements made as a result of the resources investment in the two-day fire weather forecast. It is the verification measure used for forecast performance, equal to the correct event forecasts divided by the total number of forecasts and the number of misses. Through this measure, NWS will communicate the two-day fire weather forecast and probabilistic DSS tool improvements, which support continuous support to IMETs and incident command teams for the duration of fire events in saving lives and property.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

'Schedules and Milestones', 'Deliverables', and 'Performance Measures' reflect the outcomes resulting from all four NWS program increases given the non-severability of these initiatives.

Schedule and Milestones:

FY 2022 - FY 2026

- Leveraging a NOAA Fire Weather testbed, demonstrate three new fire weather forecast and warning capabilities through Testbed experiments with participants from researchers, developers, forecasters, the inter-agency fire community, and end-users
- Conduct fire weather testbed experiments on evaluation of probabilistic guidance and messaging to improve IDSS
- Transition of at least one new or enhanced fire weather capabilities into NWS operations annually
- Implement innovative post processing methodologies to translate specialized probabilistic fire weather guidance into effective risk communication

FY 2022

- Work with SBES experts to survey fire partners and underserved communities to identify needed fire weather service improvements, and focus testbed developmental efforts
- Provide improved nationally consistent, hourly updating probabilistic lightning guidance that will be implemented through the incorporation of hourly high resolution, fine scale numerical model (High-Resolution Rapid Refresh HRRR or Rapid Refresh Forecast System (RRFS) guidance within existing NWS National Blend Model (NBM) lightning guidance
- Develop new fire weather focused metrics to measure and focus national and regional scale UFS numerical forecast improvement

FY 2023

- Provide improved nationally consistent probabilistic lightning density guidance from Day 1 through Day 2 in support of local and national impact-based decision support services requirements
- Implement new fire weather focused metrics to measure and focus national and regional scale UFS numerical forecast improvement and guide year-over-year UFS improvements to national fire weather services
- Implement annual NWS NBM guidance with improvements focused to support improved national fire weather services

FY 2024

- Develop best practices to ensure effective use of next-generation mesoscale analysis system to enable enhanced IDSS communication of the onset of critical and extreme fire weather conditions
- Implement annual upgrade of NWS NBM guidance with improvements focused to support improved national fire weather services
- Develop and implement new fire weather focused metrics for local scales to measure and focus very high resolution UFS numerical forecast improvement

FY 2025

- Implement annual NWS NBM guidance with improvements focused to support improved national fire weather services
- Implement additional fire weather focused metrics for local scales to measure and focus local very high resolution UFS numerical forecast improvement and guide year-over-year UFS improvements to nationwide fire weather services
- Share best practices to ensure effective use of next-generation mesoscale analysis system to enable enhanced IDSS communication of the onset of critical and extreme fire weather conditions
- Evaluation of existing methods to predict conditions supportive of extreme fire danger, fire ignition events, and fire behavior

FY 2026

- Provide improved high resolution guidance on terrain influenced extreme fire weather conditions to support short-range wildfire decision making
- Refine best practices to ensure effective use of next-generation mesoscale analysis system to enable enhanced IDSS communication of the onset of critical and extreme fire weather conditions
- Continue the development and implementation of refined fire weather focused metrics for local scales to measure and focus local very high resolution UFS numerical forecast improvement and guide year-over-year UFS improvements to nationwide fire weather services

Deliverables:

- Post processing techniques for translation of specialized probabilistic fire weather guidance into effective risk estimates
- Improved next generation, nationally consistent NWS fire weather services, that exploit improved UFS numerical models, which is optimized to support fire community and diverse societal needs and critical decision support requirements

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
National Fire Weather Two-Day Forecast Accuracy (Critical Success Index)					
With Increase	0.35	0.35	0.40	0.40	0.45
Without Increase	0.35	0.35	0.35	0.35	0.35
Outyear Costs:					
Direct Obligations	2,000	2,000	2,000	2,000	2,000
Capitalized	500	500	500	500	500
Uncapitalized	1,500	1,500	1,500	1,500	1,500
Budget Authority	2,000	2,000	2,000	2,000	2,000
Outlays	1,240	1,240	1,240	1,240	1,240
FTE	2	2	2	2	2
Positions	2	2	2	2	2

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Science and Technology Integration
Subactivity: Science and Technology Integration
Program Change: Seamless Weather to Climate Fire Weather Predictions to Improve Resilience and Disaster Mitigation

Title		Grade	Number	Annual Salary	Total Salaries
Meteorologist		GS-14	1	123,402	123,402
Meteorologist		GS-13	1	104,429	104,429
					0
Total			2		227,831
Less lapse	25.00%		0		(56,958)
Total full-time permanent (FTE)			2		170,873
2022 Pay Adjustment (2.7%)					4,614
					175,487

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	2
Total FTE	2
Authorized Positions:	
Full-time permanent	2
Total Positions	2

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS

(Direct Obligations amounts in thousands)

Activity: Science and Technology Integration
Subactivity: Science and Technology Integration

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	53,961	55,441	56,687	56,862	175
11.3	Other than full-time permanent	120	123	126	126	0
11.5	Other personnel compensation	1,704	1,748	1,788	1,788	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	55,785	57,312	58,601	58,776	175
12	Civilian personnel benefits	20,519	21,291	23,804	23,857	53
13	Benefits for former personnel	25	26	29	29	0
21	Travel and transportation of persons	731	645	653	653	0
22	Transportation of things	221	191	194	194	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	6,034	6,324	6,412	6,412	0
23.2	Rental Payments to others	66	68	70	70	0
23.3	Communications, utilities and misc charges	948	990	1,012	1,012	0
24	Printing and reproduction	38	35	35	35	0
25.1	Advisory and assistance services	31,691	22,082	22,406	22,406	0
25.2	Other services from non-Federal sources	13,877	10,300	10,344	10,344	0
25.3	Other goods and services from Federal sources	3,053	2,694	2,734	2,734	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	3	2	2	502	500
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,518	1,550	1,528	1,528	0
31	Equipment	647	555	561	561	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	28,024	29,430	29,922	31,194	1,272
42	Insurance claims and indemnities	1	0	0	0	0
43	Interest and dividends	3	3	2	2	0
44	Refunds	0	0	0	0	0
99	Total obligations	163,183	153,499	158,309	160,309	2,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Science Technology Integration	Pos./BA	427	158,309	435	161,809	8	3,500
	FTE/OBL	421	158,309	427	161,809	6	3,500

Co-Development of Sub-Seasonal to Seasonal (S2S) Decision Support Services to Mitigate the Impacts of Extreme Events and Enable a Resilient Society (+$3,500, 6 FTE/ 8 Positions) – This increase includes research and development, product/service development, operational transition, and user training and outreach in support of sub-seasonal to seasonal decision support services (DSS). For example, extended periods of significantly below normal temperatures can adversely impact crop planting and harvesting schedules. NWS proposes to provide improved delivery of new publicly available products and services which will better provide information to vulnerable and underserved communities. NOAA requests a total $5.3 million to develop S2S (week two to three months) DSS for long lead time extreme events that occur on a timeframe from weeks to months. This initiative also includes $0.9 million for high performance computing for Central Processing [NWS-43], $0.5 million for user engagement surveys and workshops in the Analyze, Forecast, and Support [NWS-76], and $0.4 million for improved delivery of new products and services for Dissemination [NWS-122].

Understanding and predicting extreme events on the subseasonal to seasonal time scale and their impacts has been identified in the *Weather Research and Forecasting Innovation Act of 2017* (P.L. 115-25) and the *National Integrated Drought Information System Reauthorization Act of 2018* (P.L. 115-423) as a top national priority. Decision makers are often faced with a complex array of information including intertwining tasks required to design mitigation strategies for developing responses to high impact environmental events amid greater uncertainty, which is exacerbated by climate change.

NWS will leverage social science to engage stakeholders across multiple sectors (e.g., agricultural, water resources, public health, emergency management, marine resources, and energy sectors), including decision makers in underserved communities such as Tribal governments, inner-city communities, economically disadvantaged rural regions, and other vulnerable populations, in the development of requirements for S2S DSS actionable data/services. Following the iterative engagement with stakeholders and end users to understand user requirements, NWS will engage with Weather/Water/Climate Enterprise partners in assessing how best to

use Enterprise capabilities to meet these requirements. For those areas where NOAA services can best meet user needs, NWS in partnership with the NOAA OAR Labs, will develop specific DSS data/services that meet the requirements identified. As a result, NWS will be better equipped to provide DSS Tools, training and outreach to maximize usability and actionable information in the user communities, and provide a more comprehensive suite of early warning information for enhanced decision-making for stakeholders. This will lead to increased resilience and improved mitigation planning to be better prepared for extreme events such as excessive heat and cold waves, extreme winds, droughts, floods, severe storms, winter storms, and tropical cyclones/hurricanes.

The proposed DSS will provide probabilistic information on the likelihood of extreme S2S climate events and use state of the science methods including ensemble post-processing of dynamical models, artificial intelligence/machine learning (AI/ML) tools, and statistical techniques and hybrid combinations of these different approaches. The product/services will be user-friendly, provide historical skill and confidence levels, and be targeted toward specific decision points for the different sectors (agriculture, water-resources, public health, emergency management, marine-resources and energy). These data/services will allow users to objectively include S2S climate prediction information as part of their decision-making processes, thereby enhancing user preparedness, planning, and resilience. The specific number and type of data/services developed will depend upon results of research on predictive skill limits and social science data gathering. Finally, we will utilize social science to evaluate the impact of these services to inform refinement of the existing and development of new data/services.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

'Schedules and Milestones', 'Deliverables', and 'Performance Measures' reflect the outcomes resulting from all four NWS program increases given the non-severability of these initiatives.

Schedule and Milestones:
FY 2022 – FY 2026
FY 2022

- Stakeholder meetings conducted to understand key climate-based impact decisions and how S2S information can inform those decisions

- NOAA and Weather/Water/Climate Enterprise interactions to assess capabilities/roles in meeting user needs
- NWS and NOAA labs begin product/service development based on user needs

FY 2023
- Prototype sectoral specific DSS co-developed and tested with stakeholders

FY 2024
- Evaluation of prototype sectoral specific DSS
- Operationalization of 4 prototype DSS data/services

FY 2025
- Stakeholder meetings conducted to scope improvements to first-generation data/services supporting sectoral specific DSS tools
- NWS and NOAA labs begin work on second generation DSS data/services.
- Operationalization of 4 additional prototype DSS data/services

FY 2026
- Co-development and testing of second generation sectoral specific DSS

Deliverables:
- Documentation of user needs for sectoral specific DSS
- Plan for providing DSS to underserved user communities developed and executed
- Operational DSS for agriculture, water resources, public health, emergency management, marine resources, and energy communities
- Objectively evaluated predictive skill limits and confidence levels for S2S extreme climate events including heat and cold waves, droughts, floods, severe and fire weather, ocean heat waves, and tropical cyclones/hurricanes
- Evaluation of the impact of sectoral specific DSS

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of Sectoral-Specific DSS (cumulative)					
With Increase	0	0	4	8	8
Without Increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	3,500	3,500	3,500	3,500	3,500
Capitalized	2,516	2,516	2,516	2,516	2,516
Uncapitalized	984	984	984	984	984
Budget Authority	3,500	3,500	3,500	3,500	3,500
Outlays	2,170	2,170	2,170	2,170	2,170
FTE	6	8	8	8	8
Positions	8	8	8	8	8

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Science and Technology Integration
Subactivity: Science and Technology Integration
Program Change: Co-Development of Sub-Seasonal to Seasonal (S2S) Decision Support Services to Mitigate the Impacts of Extreme Events and Enable a Resilient Society

Title		Grade	Number	Annual Salary	Total Salaries
Meteorologist		GS-14	2	143,000	286,000
Meteorologist		GS-13	2	121,000	242,000
Physical Scientist		ZP-4	2	133,000	266,000
Physical Scientist		ZP-3	2	94,000	188,000
Total			8		982,000
Less lapse	25.00%		(2)		(245,500)
Total full-time permanent (FTE)			6		736,500
2022 Pay Adjustment (2.7%)					19,886
					756,386

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	6
Total FTE	6
Authorized Positions:	
Full-time permanent	8
Total Positions	8

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Science and Technology Integration
Subactivity: Science and Technology Integration

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	53,961	55,441	56,687	57,443	756
11.3	Other than full-time permanent	120	123	126	126	0
11.5	Other personnel compensation	1,704	1,748	1,788	1,788	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	55,785	57,312	58,601	59,357	756
12	Civilian personnel benefits	20,519	21,291	23,804	24,031	227
13	Benefits for former personnel	25	26	29	29	0
21	Travel and transportation of persons	731	645	653	653	0
22	Transportation of things	221	191	194	194	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	6,034	6,324	6,412	6,412	0
23.2	Rental Payments to others	66	68	70	70	0
23.3	Communications, utilities and misc charges	948	990	1,012	1,012	0
24	Printing and reproduction	38	35	35	35	0
25.1	Advisory and assistance services	31,691	22,082	22,406	22,406	0
25.2	Other services from non-Federal sources	13,877	10,300	10,344	12,861	2,517
25.3	Other goods and services from Federal sources	3,053	2,694	2,734	2,734	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	3	2	2	2	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,518	1,550	1,528	1,528	0
31	Equipment	647	555	561	561	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	28,024	29,430	29,922	29,922	0
42	Insurance claims and indemnities	1	0	0	0	0
43	Interest and dividends	3	3	2	2	0
44	Refunds	0	0	0	0	0
99	Total obligations	163,183	153,499	158,309	161,809	3,500

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(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Science Technology Integration	Pos./BA	427	158,309	427	162,309	0	4,000
	FTE/OBL	421	158,309	421	162,309	0	4,000

Space Weather Research to Operations (+$4,000, 0 FTE/ 0 Positions) – With this increase, NOAA will support the Space Weather Prediction Testbed and co-locate it with the Space Weather Prediction Center (SWPC) in Boulder, Colorado, as a key component of a formal research-to-operations/operations-to-research (R2O2R) mechanism. Specifically, NWS will provide essential science and engineering support, facility buildout, operating costs, communication and knowledge gathering, and interagency coordination for increasing research-to-operations capabilities to better incorporate space weather research advances into its operational forecasting systems. The total NWS request for this initiative is $5.0 million, also including $1.0 million for Central Processing [NWS-52].

Space weather can disrupt the technology that forms the backbone of this country's economic vitality and national security, including satellite and airline operations, communications networks, navigation systems, and the electric power grid. A recent study (ABT - 2017[6]) indicated upwards of a $20 billion impact to just a single electric power market experiencing a nine-hour outage due to an extreme space weather event. More widespread or prolonged events will result in more significant economic impacts. The absence of a formal framework for sustaining and transitioning models and observational capabilities from R2O2R was identified by the Space Weather Operations, Research, and Mitigation (SWORM) Interagency Working Group (34 Federal departments and agencies) as a critical gap in our Nation's ability to improve existing space weather services. To close the gap, the *PROSWIFT Act* (P.L. 116-181) directs federal agencies to develop formal mechanisms to transition space weather research models and capabilities to NOAA.

The transition of research into the NOAA/NWS operational forecast-watch-warning paradigm will ensure the Nation capitalizes on the hundreds of millions of dollars in research investments. Developing the Testbed will ultimately make space weather prediction

[6] Written under contract for the NOAA National Weather Service by Abt Associates, *Social and Economic Impacts of Space Weather in the United States*, September 2017.

equivalent to terrestrial weather forecasts, watches, and warnings to ensure the Nation and communities worldwide are ready for and responsive to space-weather events with potentially global impacts.

The development of a space weather testbed will bring together space weather decision-makers, researchers (including social, behavioral, and decision science), developers, and operational forecasters working side-by-side to improve and tailor products that will provide the necessary actionable information for space weather planning and execution. SWPC will work with NASA, NSF, and DOD through a signed MOU to accelerate numerical model advances supported by NASA and NSF to NOAA operations. Additionally, the Testbed will sponsor visiting scientists and end-user decision-makers from partnering agencies, academia, the commercial enterprise, and international partners to participate in collaborative evaluations and experiments. These exchanges will also include short-term invitational travel and longer-term personnel exchanges between agencies. The PROSWIFT Act requires NOAA to lead efforts to develop both a space weather federal advisory committee (Space Weather Advisory Group) and a National Academies Roundtable on Space Weather. Both bodies will contribute to identifying ways to optimally and expeditiously integrate research into operations. To better understand the information needs of decision-makers and operational forecasters, social, behavioral, decision, and user experience research will be integrated into development and evaluation activities. Social science research will also be leveraged to gain insights into the information needs of underserved populations and improvements in reaching vulnerable communities.

The *PROSWIFT Act* requires NOAA to lead efforts to develop both a space weather federal advisory committee (Space Weather Advisory Group) and a National Academies Roundtable on Space Weather. Both bodies will contribute to identifying ways to optimally and expeditiously integrate research into operations. To better understand the information needs of decision-makers and operational forecasters, social, behavioral, decision, and user experience research will be integrated into development and evaluation activities. Social science research will also be leveraged to gain insights into the information needs of underserved populations and improvements in reaching vulnerable communities.

With this request for $4 million, Science & Technology Integration will provide essential science and engineering support, facility buildout, operating costs, communication and knowledge gathering, and interagency coordination for increasing research-to-operations capabilities to better incorporate space weather research advances into its operational forecasting systems.

‘Schedules and Milestones,’ ‘Deliverables,’ and ‘Performance Measures’ reflect the outcomes resulting from both NWS program increases given the non-severability of these initiatives.

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Space weather events can have far-reaching impacts on our Nation's economy, communications, and national security. This request will increase NOAA's ability to forecast these events by increasing research-to-operations-to-research capabilities.

Schedule and Milestones:

FY 2022 – FY 2023
- Construction of a Space Weather Prediction Testbed facility

FY 2024
- Validation and demonstration of three new space weather prediction capabilities during Testbed experiments incorporate participation from researchers, developers, forecasters, the commercial sector, and end-users

FY 2024 and beyond
- The transition of at least two new or enhanced capabilities into NWS operations annually

Deliverables:

- An NWS space weather R2O2R capability that better incorporates space weather research advances from the National Science Foundation, NASA, and the Department of Defense into the NOAA operational forecasting systems at the NOAA/NWS SWPC
- Improved NWS's forecasts, watches, and warnings that safeguard society with actionable space weather information used to mitigate the impact of space weather events

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Performance Measures	2022	2023	2024	2025	2026
Number of new or enhanced space weather capabilities transitioned to operations (cumulative)					
With Increase	2	4	6	8	10
Without Increase	1	1	2	2	3
Outyear Costs:					
Direct Obligations	4,000	4,000	4,000	4,000	4,000
Capitalized	0	0	0	0	0
Uncapitalized	4,000	4,000	4,000	4,000	4,000
Budget Authority	4,000	4,000	4,000	4,000	4,000
Outlays	2,480	2,480	2,480	2,480	2,480
FTE	0	0	0	0	0
Positions	0	0	0	0	0

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Science and Technology Integration
Subactivity: Science and Technology Integration

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	53,961	55,441	56,687	56,687	0
11.3	Other than full-time permanent	120	123	126	126	0
11.5	Other personnel compensation	1,704	1,748	1,788	1,788	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	55,785	57,312	58,601	58,601	0
12	Civilian personnel benefits	20,519	21,291	23,804	23,804	0
13	Benefits for former personnel	25	26	29	29	0
21	Travel and transportation of persons	731	645	653	853	200
22	Transportation of things	221	191	194	194	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	6,034	6,324	6,412	6,412	0
23.2	Rental Payments to others	66	68	70	70	0
23.3	Communications, utilities and misc charges	948	990	1,012	1,012	0
24	Printing and reproduction	38	35	35	35	0
25.1	Advisory and assistance services	31,691	22,082	22,406	22,906	500
25.2	Other services from non-Federal sources	13,877	10,300	10,344	10,344	0
25.3	Other goods and services from Federal sources	3,053	2,694	2,734	3,734	1,000
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	3	2	2	2	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,518	1,550	1,528	1,728	200
31	Equipment	647	555	561	561	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	28,024	29,430	29,922	32,022	2,100
42	Insurance claims and indemnities	1	0	0	0	0
43	Interest and dividends	3	3	2	2	0
44	Refunds	0	0	0	0	0
99	Total obligations	163,183	153,499	158,309	162,309	4,000

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(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Science Technology Integration	Pos./BA	427	158,309	427	154,623	0	(3,686)
	FTE/OBL	421	158,309	421	154,623	0	(3,686)

Delay the COASTAL Act implementation (-$3,686, 0 FTE/ 0 Positions) – This reduction will delay implementation of the *Consumer Option for an Alternative System To Allocate Losses (COASTAL) Act of 2012* in order to better align NOAA's timeline with FEMA's. Per correspondence, FEMA will be unable to implement the COASTAL Act in FY 2022. The purpose of the COASTAL Act is to lower costs to FEMA's National Flood Insurance Program by better discerning wind versus water damage in the case of "indeterminate losses;" that is, where little tangible evidence beyond a building's foundation ("slab") remains for the proper adjustment of insurance claims for homes totally destroyed by a tropical cyclone.

Presently, NWS' development of the Named Storm Event Model (NSEM) and Coastal Wind and Water Event Database (CWWED) are 90% complete and on schedule. The final steps for implementation of the COASTAL Act are for NOAA to transition the CWWED and NSEM to the operational supercomputer and deploy observational sensors to facilitate the generation of post-storm assessments that determine the strength and timing of damaging winds and water using pre-defined triggers for tropical cyclones. To operationalize the COASTAL Act, FEMA must also complete and implement a new COASTAL Act formula for initiating generation of post-storm assessments. This program change will delay final implementation.

Schedule and Milestones:

FY 2022 – FY 2026
FY 2022

- Archival and documentation of codes and scripts of the NSEM and CWWED in github repositories for public access
- Archival of model hindcast outputs and observational datasets for all validation cases in the cloud for public access
- Archival of storm surge basins, which will no longer be updated nor maintained for accuracy of topography and bathymetry
- Reduce and restructure allocation of high performance computing for NSEM development and operations and maintenance (O&M), from 1.5M core hours per month to 150K cores, thus restricting concurrent model development and O&M

FY 2023 - FY 2026

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- Minimal maintenance of NSEM's storm surge, wave, hydrology and precipitation, and wind analysis models for relevancy in Unified Forecast System
- Minimal maintenance of CWWED
- Minimal maintenance of digital elevation models for accuracy

Deliverables:
- Publicly accessible and well-documented NSEM and CWWED codes and scripts
- Publicly accessible and well-documented observational datasets and model outputs for validation cases (i.e., Ike, Isabel, Irma, Sandy, Irene, Michael, Florence, Harvey, Maria, and Lane)

Performance Measures	2022	2023	2024	2025	2026
Number of post-storm assessments					
Without Decrease	1	1	1	1	1
With Decrease	0	0	0	0	0
Number of observational sensors deployed					
Without Decrease	0	15	15	15	15
With Decrease	0	0	0	0	0
Outyear Costs:					
Direct Obligations	(3,686)	(3,686)	(3,686)	(3,686)	(3,686)
Capitalized	0	0	0	0	0

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Uncapitalized	(3,686)	(3,686)	(3,686)	(3,686)	(3,686)
Budget Authority	(3,686)	(3,686)	(3,686)	(3,686)	(3,686)
Outlays	(2,285)	(2,285)	(2,285)	(2,285)	(2,285)
FTE	0	0	0	0	0
Positions	0	0	0	0	0

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Science and Technology Integration
Subactivity: Science and Technology Integration

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Decrease from 2022 Base
11.1	Full-time permanent compensation	53,961	55,441	56,687	56,687	0
11.3	Other than full-time permanent	120	123	126	126	0
11.5	Other personnel compensation	1,704	1,748	1,788	1,788	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	55,785	57,312	58,601	58,601	0
12	Civilian personnel benefits	20,519	21,291	23,804	23,804	0
13	Benefits for former personnel	25	26	29	29	0
21	Travel and transportation of persons	731	645	653	653	0
22	Transportation of things	221	191	194	194	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	6,034	6,324	6,412	6,412	0
23.2	Rental Payments to others	66	68	70	70	0
23.3	Communications, utilities and misc charges	948	990	1,012	1,012	0
24	Printing and reproduction	38	35	35	35	0
25.1	Advisory and assistance services	31,691	22,082	22,406	22,406	0
25.2	Other services from non-Federal sources	13,877	10,300	10,344	10,344	0
25.3	Other goods and services from Federal sources	3,053	2,694	2,734	2,734	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	3	2	2	(3,684)	(3,686)
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,518	1,550	1,528	1,528	0
31	Equipment	647	555	561	561	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	28,024	29,430	29,922	29,922	0
42	Insurance claims and indemnities	1	0	0	0	0
43	Interest and dividends	3	3	2	2	0
44	Refunds	0	0	0	0	0
99	Total obligations	163,183	153,499	158,309	154,623	(3,686)

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(Dollar amounts in thousands)

Activity: Systems Acquisition
Subactivity: Observations

Goal Statement

The Procurement, Acquisition, and Construction (PAC) Observations Programs, Projects, and Activities (Subactivity) supports the life-cycle of all NWS observing system investments by providing technical solutions to meet NWS' operational observational requirements. With PAC funding, NOAA improves current observational capabilities, provides large scale recapitalization of significant observational systems, and engineers technical solutions for systems to meet evolving requirements and demands in support of the Department of Commerce 2018-2022 Strategic Plan, Strategic Objective 3.3 Reduce Extreme Weather Impacts.

Base Program

Observations is responsible for the collection of space, atmosphere, water, and climate observational data owned or leveraged by NWS. Observations is also responsible for the development, acquisition and management of cost-effective observing technologies, hardware and software enhancements, maintenance and repairs, logistics, cost management, technical data verification, and life-cycle replacements of NWS observational platforms.

Specifically, with the PAC appropriation, the funds in the PAC Observations Subactivity are used to:

- Extend the service life of the Nation's weather radar network; and
- Extend the service life of the Nation's primary surface weather observing network supporting aviation operations, and the needs of the meteorological, hydrological, and climatological research communities.

Statement of Operating Objectives

Schedule and Milestones:
FY 2022-2026

Next Generation Weather Radar (NEXRAD) Service Life Extension Program (SLEP)

- Complete pedestal refurbishments
- Complete refurbishment of engine/generator systems

Automated Surface Observing System (ASOS) SLEP

- Complete production and installation of Acquisition Control Unit (ACU) and Data Collection Package (DCP) upgrades
- Complete telecommunications architecture upgrades

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Deliverables:

NEXRAD SLEP

- Refurbish pedestals with expected service life beyond 2035
- Refurbish engine/generator systems with expected service life beyond 2035

ASOS SLEP

- Total refreshment of ACU-DCU with expected service life to at least 2040
- Increase data flow and remote maintenance capabilities

Explanation and Justification

		2020 Actual		2021 Enacted		2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Observations	Pos/BA	0	16,215	0	15,700	0	15,700
	FTE/OBL	0	29,492	0	15,700	0	15,700

PAC Observations objectives are achieved through the following programs:

Next Generation Weather Radar (NEXRAD) SLEP is an effort to sustain the aging NEXRAD infrastructure that underpins severe weather forecast and warning services for high-impact events critical for a WRN. NEXRAD is a tri-agency program with the U.S. Department of Defense and the U.S. Department of Transportation (DOT). Though the system is nearing end of life, the Federal government is 20 years away from full deployment of the next generation of weather radar design. Therefore, NWS is undertaking a technology refresh effort to sustain NEXRAD fleet availability until the current network is replaced.

Automated Surface Observing System (ASOS) SLEP is a cost effective approach to maintaining the aging ASOS infrastructure that provides critical aviation weather parameters at airports supporting the air transportation industry, and provides high quality meteorological data supporting NWS's forecast and warning mission. The original capital investment for this system was $227 million and was initiated in the mid-1980s. In addition to extending its longevity, the ASOS SLEP enhances overall system capabilities by enabling high speed/high resolution data transmissions; provides greater safety to aviation operations by increasing reliability of the system, as well as a stable platform for more consistent and accurate data; and allows for remote and cost effective maintenance,

logistics, and training. ASOS is an inter-agency effort supporting meteorological observational requirements of NOAA, DoD and DOT.

In FY 2021, NWS made good progress in all NEXRAD SLEP projects toward achieving performance goals and extending the system's service life beyond 2035.

In FY 2022, NWS will continue its Next Generation Weather Radar (NEXRAD) Service Life Extension Program (SLEP), completing engine/generator, and continuing pedestal refurbishments, to extend overall service life, and reduce the average time between failures. NWS will also continue the Automated Surface Observing System (ASOS) SLEP with production and installation of the upgraded Acquisition Control Unit (ACU) and Data Collection Package (DCP), in partnership with and including reimbursable funding from tri- agency partners, the FAA and the DoD.

Without continued support for the NEXRAD and ASOS SLEP projects, provided for in Observations PAC, NWS cannot continue to support necessary enhancements and life-cycle replacements of these systems that collect and process observations necessary to provide weather forecasts, warning, and outlooks.

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Outyear Funding Estimates*

Observations	2021 & Prior	2022	2023	2024	2025	2026	CTC	Total
Change from 2022 Base	N/A	8,529	TBD	TBD	TBD	TBD	N/A	N/A
Total Request	131,307	24,229	TBD	TBD	TBD	TBD	N/A	TBD

*Outyears are estimates. Future requests will be determined through the annual budget process. The full outyear funding estimates are to be determined (TBD) because NWS is reassessing the 5 year profile for the ASOS SLEP program.

NEXRAD	2021 & Prior	2022	2023	2024	2025	2026	CTC	Total
Change from 2022 Base	N/A	0	-8,040	-8,200	-8,200	-8,200	N/A	N/A
Total Request	88,807	8,200	160	0	0	0	N/A	97,167

*Outyears are estimates. Future requests will be determined through the annual budget process.

ASOS	2021 & Prior	2022	2023	2024	2025	2026	CTC	Total
Change from 2022 Base	N/A	0	TBD	TBD	TBD	TBD	N/A	N/A
Total Request	42,500	7,500	TBD	TBD	TBD	TBD	N/A	TBD

*Outyears are estimates. Future requests will be determined through the annual budget process. The full outyear funding estimates are to be determined (TBD) because NWS is reassessing the 5 year profile for the ASOS SLEP program.

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		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Observations	Pos./BA	0	15,700	0	23,759	0	8,059
	FTE/OBL	0	15,700	0	23,759	0	8,059

Improve Climate and Weather Predictions by recapitalizing the Tropical Atmosphere Ocean (TAO) array (+$8,059, 0 FTE/ 0 Positions) – This increase addresses a much-needed overhaul of the long-standing TAO array in the tropical Pacific. The existing TAO array, consisting of 55 moorings in the Tropical Pacific Ocean, measures marine weather and subsurface ocean parameters to a depth of 500 meters. These data are critical to understanding and predicting El Niño Southern Oscillation (ENSO). ENSO phenomena have a substantial impact on the United States and global weather through floods, droughts, forest fires, tropical cyclones, and other severe weather events. The present monitoring system is obsolete and is becoming unsustainable. NOAA is requesting a total of $10.5 million for modernizing the TAO array, also including $2.4 million in Observations ORF [NWS-20].

This request will enable NWS to recapitalize and modernize the moorings and sensors, and provide additional capability to measure key weather and ocean parameters in real-time at the optimal vertical resolution based on the best science available. In addition to improved system availability, the increased capability and modernized sensors and electronics are expected to produce improved analyses and forecasts of climate events such as ENSO, and improved weather warnings and forecasts for the NWS Pacific Region. An enhancement of the observing capabilities for the array, as described by the “Tropical Pacific Observing System (TPOS) 2020 Project” will greatly improve ocean monitoring to support forecasting for sub-seasonal to seasonal weather events and climate monitoring and research. The TPOS 2020 project, initiated and led by NOAA beginning in 2014 and concluding in 2020, described an internationally-coordinated and supported sustainable observing system for the Tropical Pacific Ocean. See https://tpos2020.org/

This investment is for technology refresh to recapitalize and modernize the obsolete systems and components, and increase the capabilities for collecting ocean observations as recommended by the TPOS 2020 Report. It also includes required resources for additional contract ship time provided through the NOAA Fleet Council Fleet Allocation Plan, for ongoing maintenance of the moorings, improving system performance and the availability of observations. This proposal is for additional funding for vessel charters that are under NOAA contract, not for buying more time on NOAA fleet vessels. Without this needed investment, NWS will fail to meet its TAO operational availability and data requirements, as the sensors and equipment continue to fail, increasingly over

time. NOAA presently struggles to maintain system availability at eighty percent as directed by Congress, adversely impacting confidence in our analyses and subsequent forecasts.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022 - FY 2026
FY 2022
- Engineering and system design for the new, modern buoys
- Initial procurement for new sensors and other buoy hardware, and assembly and preparation of buoys/moorings for 35% (30 buoys, that includes 50% sparing level) of the TAO array to meet the TPOS 2020 report standards
    - Weather sensors include surface air temperature, humidity, surface winds, barometric pressure, precipitation, and shortwave & longwave radiation measurements
    - Subsurface ocean sensors include additional undersea temperature sensors, for a total of at least 13 subsurface depths per mooring, as well as the addition of ocean salinity measurements and real-time subsurface ocean current meters and current profilers at some locations

FY 2023 - FY 2025
- Continue procuring sensors and equipment and preparation of buoys, and deploying the new buoys/sensors listed above for the existing TAO array (30 buoys in FY 2023, 20 buoys in FY 2024, and 10 buoys in FY 2025, including the necessary spares at a 50% level)

FY 2026
- Recapitalization of the TAO array complete

Deliverables:
- For weather measurements: expanding beyond surface air temperature, humidity, and winds, to include barometric pressure, precipitation and shortwave & longwave radiation measurements
- For subsurface ocean measurements: additional undersea temperature sensors in the mixed layer for a total of at least 13 subsurface depths per mooring, plus the addition of ocean salinity measurements at some locations, and real-time subsurface ocean current profile measurements and near-surface ocean velocity at select locations

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Performance Measures	2022	2023	2024	2025	2026
System availability of TAO network					
With Increase	80%	80%	80%	80%	80%
Without Increase	80%	70%	60%	55%	50%
Direct Obligations	8,059	6,094	4,094	2,334	0
Capitalized	8,059	6,094	4,094	2,334	0
Uncapitalized	0	0	0	0	0
Budget Authority	8,059	6,094	4,094	2,334	0
Outlays	2,821	2,133	1,433	817	0
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Outyear Funding Estimates:

TAO	2021 & Prior	2022	2023	2024	2025	2026	CTC	Total
Change from 2022 Base	N/A	8,059	-1,965	-3,965	-5,725	-8,059	N/A	N/A
Total Request	N/A	8,059	6,094	4,094	2,334	0	N/A	20,581

*Outyears are estimates. Future requests will be determined through the annual budget process.

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Observations
Subactivity: Observations

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	1	0	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	19	0	0	0	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	20	0	0	0	0
12	Civilian personnel benefits	1	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	93	55	55	55	0
22	Transportation of things	31	15	15	15	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	401	436	436	436	0
23.2	Rental Payments to others	85	42	42	42	0
23.3	Communications, utilities and misc charges	41	47	47	47	0
24	Printing and reproduction	2	2	2	2	0
25.1	Advisory and assistance services	4,676	2,508	2,508	4,508	2,000
25.2	Other services from non-Federal sources	10,527	5,745	5,745	5,745	0
25.3	Other goods and services from Federal sources	50	59	59	59	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	13,062	6,521	6,521	8,580	2,059
31	Equipment	40	32	32	4,032	4,000
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	463	237	237	237	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	1	1	1	0
44	Refunds	0	0	0	0	0
99	Total obligations	29,492	15,700	15,700	23,759	8,059

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(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Observations	Pos./BA	0	15,700	0	16,170	0	470
	FTE/OBL	0	15,700	0	16,170	0	470

Enterprise Infrastructure Solutions (EIS) (+$470, 0 FTE/ 0 Positions) – This increase will enable NOAA to conduct a technology modernization and support an accelerated transition of telecommunications services to the GSA EIS contract vehicle. DOC currently uses GSA's Networx, Washington Interagency Telecommunications System 3, and regional contracts to acquire telecommunication services. These contracts expire in May 2023. Between now and then, DOC will be transitioning telecommunications services to the GSA EIS follow-on contract. The total NWS request for this initiative is $12.6 million, which includes $11.4 million in Dissemination ORF [NWS-127], $0.75 million in Observations ORF [NWS-24], and $0.47 million in Observations PAC. Additional NOAA EIS requests can also be found in Mission Support [MS-66], NOS [NOS-48; NOS-88; NOS-120; NOS-149], NMFS [NMFS-70], NESDIS [NESDIS-37], and OMAO [OMAO-19].

Specifically, this request focuses on EIS for surface observing (ASOS) and radar (NEXRAD/SPG/NPN) circuits. NWS is required to transition all circuits provisioned by the Dissemination and Observation portfolios to facilitate these communications, necessitating the purchase of new hardware. There will be costs for trenching and laying these new lines, procurement, and implementation of network hubs to allow communications on NWS networks between the legacy vendors and the new vendor circuits during the transition period. NWS also requires support services to facilitate the architecture and installations throughout the transition. NWS anticipates it will take up to 5 years to transition all circuits to the new contract.

If NWS does not move to quickly transition to EIS before the expiration of the Networx contract, there are two risks:

1) Circuits will be disconnected by the vendor placing mission operations at risk
2) The incumbent Networx vendor will move the circuit to a month-to-month commercial circuit, which could double or triple the cost, depending on the location and technology. These levels are not affordable within the program.

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The modernization enables NOAA to re-architect its network infrastructure to gain efficiencies and resilience, realize significantly reduced costs for network services after transition, and minimize risk as legacy services are discontinued. Increased funding will accelerate the transition and enable NOAA to: (a) contract for engineering services to re-architect the network infrastructure and establish detailed transition plans; (b) issue awards for new hardware and telecommunication services; (c) trench and lay new lines, decommission and provision circuits; and (d) establish funding for administrative services to provide ordering, invoice processing, and inventory management. By expediting the technology modernization and migration to the new EIS vendors, NOAA will realize significant reductions in price and cost-avoidance. This funding will reduce risks related to service delivery and operations due to termination of GSA legacy service contracts.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

'Schedules and Milestones', 'Deliverables', and 'Performance Measures' reflect the outcomes resulting from all three NWS program increases given the non-severability of these initiatives.

Schedule and Milestones:

FY 2022 - 2026
FY 2022

- Establish contractual services for the required level of support to plan and engineer the transition
- Award NOAA task orders under EIS to support modernization needs
- Establish a sustainable, resilient architecture to meet NWS's current and planned needs
- Begin transition of NWS Legacy GSA inventory to EIS
- Transition 86 ASOS SLEP sites
- Transition 53 NEXRAD landlines

FY 2023

- Transition 53 NEXRAD landlines
- Transition 4 NEXRAD VSATs
- Transition 10 NEXRAD 4G sites
- Transition 300 ASOS SLEP sites

FY 2024

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(Dollar amounts in thousands)

- Transition 53 NEXRAD landlines
- Transition 12 NEXRAD VSATs
- Transition 50 NEXRAD 4G sites
- Transition 199 ASOS SLEP sites

FY 2025

- Transition 53 NEXRAD landlines
- Transition 12 NEXRAD VSATs
- Transition 50 NEXRAD 4G sites
- Transition 100 ASOS SLEP sites

FY 2026

- Transition 53 NEXRAD landlines
- Transition 12 NEXRAD VSATs
- Transition 50 NEXRAD 4G sites

Deliverables:

- Modernized telecommunications infrastructure capable of meeting the agency's mission
- Provide a centralized ordering and management platform
- Provide a secure infrastructure resistant to extreme weather impacts

Performance Measures	2022	2023	2024	2025	2026
Percentage of circuits transitioned to the new EIS contract					
With Increase	15	40	65	90	100
Without Increase	0	10	20	30	40

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Outyear Costs:					
Direct Obligations	470	1,215	1,109	849	583
Capitalized	0	0	0	0	0
Uncapitalized	470	470	470	470	470
Budget Authority	470	1,215	1,109	849	583
Outlays	165	425	388	297	204
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Outyear Funding Estimates:

Observations PAC EIS	2021 & Prior	2022	2023	2024	2025	2026	CTC	Total
Change from 2022 Base	N/A	470	745	639	379	113	N/A	N/A
Total Request	N/A	470	1,215	1,109	849	583	N/A	4,226

*Outyears are estimates. Future requests will be determined through the annual budget process.

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Observations
Subactivity: Observations

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	1	0	0	0	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	19	0	0	0	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	20	0	0	0	0
12	Civilian personnel benefits	1	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	93	55	55	55	0
22	Transportation of things	31	15	15	15	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	401	436	436	436	0
23.2	Rental Payments to others	85	42	42	42	0
23.3	Communications, utilities and misc charges	41	47	47	517	470
24	Printing and reproduction	2	2	2	2	0
25.1	Advisory and assistance services	4,676	2,508	2,508	2,508	0
25.2	Other services from non-Federal sources	10,527	5,745	5,745	5,745	0
25.3	Other goods and services from Federal sources	50	59	59	59	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	13,062	6,521	6,521	6,521	0
31	Equipment	40	32	32	32	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	463	237	237	237	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	1	1	1	0
44	Refunds	0	0	0	0	0
99	Total obligations	29,492	15,700	15,700	16,170	470

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(Dollar amounts in thousands)

Activity: Systems Acquisition
Subactivity: Central Processing

Goal Statement

The PAC Central Processing Subactivity ensures the uninterrupted flow of information from the collection of observations, to central guidance production, to local applications of all essential weather and climate data products, and continuity of public watches and warnings in support of the Department of Commerce 2018-2022 Strategic Plan, Strategic Objective 3.3 Reduce Extreme Weather Impacts.

Base Program

Central Processing is responsible for program and budget planning for the Weather and Climate Operational Supercomputing System (WCOSS) and the Advanced Weather Interactive Processing System (AWIPS). Central Processing is also responsible for maintaining an optimum processing systems configuration and an enterprise architecture for processing systems to meet current and future NWS mission requirements, including the strategy for maximizing effectiveness while minimizing operating costs and coordination with the Office of Dissemination.

Statement of Operating Objectives

Schedule and Milestones:
FY 2022–2026

- Provide Operations and Maintenance support for WCOSS
- Provide Operations and Maintenance support for NOAA's R&D HPC System
- Phased implementation of new forecast tools and capabilities into AWIPS.

FY 2022

- Transition operations to new WCOSS contract
- Provide Operations and Maintenance support for new WCOSS computing configuration

Deliverables:

- Operational WCOSS with full backup capability
- Production Suite On-Time Product Generation at 99 percent

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- Sustained WCOSS capacity at 12.1 TFLOPS, in each of the primary and backup systems
- New forecast tools and capabilities for IDSS/WRN operations
- Weather Event Simulator integration into AWIPS

Explanation and Justification

		2020 Actual		2021 Enacted		2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Central Processing	Pos/BA	21	66,444	26	97,772	26	97,772
	FTE/OBL	22	116,901	25	97,772	25	97,772

PAC Central Processing objectives are achieved through the following programs:

Weather and Climate Operational Supercomputing System (WCOSS) supports (a) weather and climate forecasting capabilities 24 hours per day/7 days a week, (b) numerical environmental prediction model development and testing, and (c) dissemination of operational products using a wide area network. These products include national and global weather, water, climate and space weather guidance, forecasts, warnings and analyses to a broad range of users and partners including other NOAA programs, government agencies, military, and the general public.

WCOSS is composed of primary and backup operational supercomputing systems, storage resources, wide area network, support services, and developmental research and development computing systems. The primary system runs the NCEP production suite. The backup is used to thoroughly test new weather and climate forecasting applications when it is not being used to run the production suite (during a backup system test or an actual emergency). The backup supercomputer system is capable of handling 100 percent of the operational workload should the primary supercomputer system be disrupted. In accordance with NOAA Critical Infrastructure Protection plans, implementation and maintenance of a redundant WCOSS architecture ensures uninterrupted flow of weather and climate data and products, such as storm watch and warning services to the public.

WCOSS also provides NWS access to developmental computing systems through the NOAA-wide enterprise Research and Development High Performance Computing System.

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Advanced Weather Interactive Processing System (AWIPS) is an information processing, display, and telecommunications system that is the cornerstone of NWS field operations. AWIPS provides the following services:

- Integrates and displays radar, satellite, and other meteorological and hydrological data at NWS field offices;
- Acquires and processes data from sensors and local sources;
- Provides computational and display functions at the forecaster's desk;
- Provides an interactive communications system to interconnect NWS operational sites;
- Initiates the dissemination of weather and flood warnings and forecasts in a rapid and highly reliable manner; and,
- Provides the communication interface for internal and external users of much of NOAA's real-time environmental data.

Sustained investments in the AWIPS hardware, communications, and software infrastructure, are necessary for integrating many other programs such as NEXRAD, and other weather radars, weather satellites, sensors, and instruments. NWS Government Performance and Results Act goals are based on the effective use of these technology investments along with advanced decision assistance tools, forecast preparation and advanced database capabilities. As the NWS continues to evolve toward an IDSS-based WRN, improvements to AWIPS technology will be needed to ensure NWS meteorologists and hydrologists have the necessary tools and technology. Continued AWIPS improvements produce increased performance in the Government Performance and Results Act goals of Tornado Warning Lead Time, Flash Flood Warning Lead Time, and Winter Storm Warning Lead Time.

In FY 2022, NWS will continue to develop new Advanced Weather Interactive Processing System (AWIPS-II) forecast capabilities, complete the transition of operational modeling applications onto new high performance computing systems under the follow-on Weather and Climate Operational Supercomputing System (WCOSS) contract, and begin running these systems operationally.

Without continued support for WCOSS and for investments in AWIPS, provided for in Central Processing PAC, NWS cannot provide operational and developmental high performance computing (HPC) capacity, and forecast and process improvements within AWIPS.

Outyear Funding Estimates*

Central Processing	2021 & Prior	2022	2023	2024	2025	2026	CTC	Total
Change from 2022 Base	N/A	0	0	0	0	0	N/A	N/A
Total Request	N/A	68,000	68,000	68,000	68,000	68,000	N/A	Recurring

*Outyears are estimates. Future requests will be determined through the annual budget process.

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National Oceanic and Atmospheric Administration
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JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Systems Acquisition
Subactivity: Dissemination

Goal Statement

The advancement of the NOAA Weather Radio (NWR) Program is a life-saving mission critical component in the delivery of short-fused warnings and emergency messages for American Public and near shore marine community. In preparation for the U.S. General Services Administration (GSA) mandated transition to new telecommunications contracts under the Enterprise Infrastructure Solutions (EIS) Contract, NWS must migrate off the legacy copper lines to new and innovative wireless technologies to continue the delivery of time-sensitive warnings over NWR broadcasts.

The NOAA Integrated Dissemination Program (IDP) is a multi-year NWS response to organizational and technical dissemination challenges created through the years as individual efforts built stovepipes across the NWS enterprise. These weaknesses resulted in telecommunications, web sites and other system outages with near-national impacts during severe weather events. These outages highlighted the urgent need for organizational change and the development of a reliable and scalable NWS on-premise private cloud (a dissemination infrastructure) to sustain 24 hours a day/7 days a week mission operations in support of the Department of Commerce 2018-2022 Strategic Plan, Strategic Objective 3.3 Reduce Extreme Weather Impacts.

IDP reached Full Operating Capability in FY 2018, and by the end of FY 2021, NWS anticipates that 38 applications will be running operationally on the on-premise private cloud, but there will remain approximately 17 additional mission essential applications running on legacy stovepipe systems and legacy web farms with no additional capacity on IDP or resources to transition or sustain the applications and services. Knowing this constraint for several years, in FY 2019 NWS began the exploration of public cloud use for applications that do not perform primary mission essential functions. In FY 2020 the NWS explored and successfully utilized the public cloud for the development environment of one of its largest applications, thereby conserving space on the IDP private cloud for the operational environment. In FY21 NWS is building a Geographical Informational Services (GIS) Viewer (a way of visualizing data overlayed on a map) for implementation in the public cloud. Moving forward, the NWS continues to evaluate this option for other applications, as well as the possibility of migrating non-mission critical applications that remain on legacy hardware to determine if the public cloud could provide a viable and secure option.

Base Program

To ensure a Weather-Ready Nation and optimize the delivery of scalable and agile dissemination capabilities, the PAC Dissemination Subactivity is organized around infrastructure, networks, web services and warning dissemination services.

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Specific to the PAC appropriation, funding within the PAC Dissemination Subactivity:

- Procures NWS' IT dissemination infrastructure and services;
- Closes NWS' dissemination requirements and gaps;
- Enhances and maintains NWS' dissemination system and application capabilities; and
- Develops a strategy to maximize effectiveness while minimizing cost.

Statement of Operating Objectives

Schedule and Milestones:
FY 2022 – FY 2026

- Provide processing and storage resources to support WRN
- Conduct maintenance and enhancements of existing IDP applications and services
- Conduct annual phase of five-year refresh of Dissemination Infrastructure hardware
- Conduct enhancements of GIS and web services both on-premise private cloud and off-premise public cloud environments
- Transition from the General Services Administration (GSA) Networx contract to GSA Enterprise Infrastructure Solutions contract based on both budgetary resources and network engineering expertise
- Replace legacy NWR copper circuits to wireless technologies
- Replace obsolete NWR transmitter site monitoring equipment

Deliverables:

- Robust and high capacity websites for NWS Field Offices
- Improved reliability of enterprise GIS capabilities on IDP and through Public Cloud Services

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(Dollar amounts in thousands)

Explanation and Justification

		2020 Actual		2021 Enacted		2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Dissemination	Pos/BA	0	9,806	0	9,934	0	9,934
	FTE/OBL	0	10,334	0	9,934	0	9,934

To achieve these goals, NWS manages the following programs:

NOAA Weather Radio
NOAA Weather Radio (NWR) provides the NWS with the capability to quickly disseminate severe and high impact weather warnings, watches and forecasts and non-weather emergency messages to the public. In FY 2020, NWS continued its slow transition of NWR legacy technology to Ethernet/Internet Protocol-based services within budgetary resources. Furthermore, in FY 2020 and 2021, NWS has continued to strengthen its partnership with FEMA to look for efficiencies in delivering both weather and non-weather emergency messages via NWR and FEMA's Integrated Public Alert and Warning System. This partnership ensures that messages from both the Federal Communication Commission managed Emergency Activation System (EAS) and Wireless Emergency Alerts (WEA) are distributed appropriately. This has included the FY 2020 implementation to expand the WEA alerts from 90 characters to 360 characters, as well as providing the messages in Spanish.

Improve Dissemination Reliability Project
The improved dissemination reliability project encompasses the efforts previously under the NWS Telecommunications Gateway and the Ground Readiness Project. Together, these projects mitigate risk to mission operations during severe weather events by enhancing capabilities to reduce single points of failure and increase website capacity.

Providing phased hardware refresh of the IDP architecture and modest enhancements to existing core applications on IDP ensures reliable delivery of NWS products to users and capitalizes on better observation data and prediction models to improve services.

Acquiring backup satellite-based communication paths to NWS WFOs, will make the NWS network infrastructure more resilient and robust while also decreasing the risk of product delivery outages.

Specific activities, spanning multiple years, include:

- Reducing Enterprise Single Points of Failure: Acquiring robust and reliable networking capabilities by upgrading networking lines (such as aging copper lines) with fiber optics and providing a backup satellite-based network path at mission-critical NWS WFOs.
- Conducting enhancements and upgrades of existing IDP applications and services.
- Providing Robust and Enterprise Web and GIS services: Increasing web and GIS services for NWS WFOs at the primary and backup integrated dissemination sites to ensure the services align with growing requirements and increased use during severe weather events.
- Integrating IT Infrastructure Redesign and Upgrades: Enhance the delivery of web and GIS services, as well as the radar, model, and observational data necessary as new satellites with increased data collection become operational.
- Continuation of an effort to assess applications currently on IDP, as well as those identified for migration to IDP, to determine if utilizing the public cloud as a host would meet the requirement of the application with reengineering efforts, create efficiencies, and be cost effective.
- Transition of non-primary mission essential functions to public cloud delivery solutions based on budgetary resources.

Without the continued support for NWR and the Improve Dissemination Reliability Project, provided for in Dissemination PAC, NWS cannot continue to enhance the infrastructure of NWS dissemination systems and upgrade existing applications, including web and GIS services, to meet new satellite and model data requirements, as well as upgrades to select NOAA Weather Radio locations.

Outyear Funding Estimates*

Dissemination	2021 & Prior	2022	2023	2024	2025	2026	CTC	Total
Change from 2022 Base	N/A	0	0	0	0	0	N/A	N/A
Total Request	N/A	9,934	9,934	9,934	9,934	9,934	N/A	Recurring

*Outyears are estimates. Future requests will be determined through the annual budget process.

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(Dollar amounts in thousands)

Activity: NWS Construction
Subactivity: Facilities Construction and Major Repairs

Goal Statement

The objective of the Construction activity is to construct and provide for major repairs to forecast offices and other government-owned and leased weather facilities in support of the Department of Commerce 2018-2022 Strategic Plan, Strategic Objective 3.3 Reduce Extreme Weather Impacts.

Base Program

To support its mission, the NWS operates and maintains 122 Weather Forecast Offices (WFO), 13 River Forecast Centers (RFC), 18 Weather Service Offices (WSO) and associated employee housing units, and 9 National Centers. There are 85 owned and 37 leased WFOs and WFO/RFCs. To support these facilities, the Facilities Construction & Major Repairs Subactivity account is managed by NWS Headquarters Office of Facilities.

The objectives of the Facilities Construction & Major Repairs activity are to:

- Upgrade and improve NOAA's NWS Facilities;
- Maintain operational readiness by addressing deferred maintenance and real property disposal; and
- Maintain compliance with Federal law and national and local building codes.

Statement of Operating Objectives

Schedule and Milestones
FY 2022 – 2026

- Design and build out tenant improvements for the relocation of up to seven operational sites
- Award contracts for highest priority repairs, replacements, and real property disposals

Deliverables

- Mandatory relocations addressed through new GSA leases
- Completed tenant improvements, construction, and relocate operations
- Necessary actions conducted for real property disposals and deferred maintenance addressed with available resources

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JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Explanation and Justification

		2020 Actual		2021 Enacted		2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
NWS Construction	Pos/BA	0	9,833	0	10,000	0	10,000
	FTE/OBL	0	6,695	0	10,000	0	10,000

NWS facilities have exceeded 25 years of age and now require extensive capital improvements to maintain operational readiness to support a Weather-Ready Nation. Immediate capital investments are required to address deficiencies in both leased and owned facilities including mission critical infrastructure such as heating, ventilation, and air conditioning systems (HVAC), emergency power generators, roofs, flooring systems, and uninterruptible power supply replacements. This effort is essential to ensure the safety of the workforce and continuity of uninterrupted warnings, watches and forecasts for local communities and for our partner agencies, the FAA and DOD. NWS relies on Facilities PAC funding to cover the costs of tenant improvements and move costs associated with forced office relocations resulting from the competitive procurement of new GSA leases. The Facilities Portfolio must meet the evolving needs of the NWS mission to provide facilities that enable a fully integrated field structure capable of supporting impact-based decision support services (IDSS).

In FY 2021, NWS completed the design and awarded construction for the forced relocation of Charleston, WV and initiated the forced relocation of WFO Topeka, KS. In the remainder of the year, NWS will complete the relocation of WFO Albany; work with GSA to award a lease for the new location of the WFO/RFC Slidell in New Orleans, LA; and award a new GSA lease to the Greenville-Spartanburg airport after the transfer of NWS' ownership of WFO Greenville/Spartanburg, SC to the airport. NWS plans to complete a project in the NWS Headquarters building to address it's failing chilled water cooling system and replace the generator's automatic transfer switch that is needed to support 24/7 operations. NWS will continue to address the aging infrastructure of its Headquarters building and initiate the data center infrastructure refresh project. In FY 2022, NWS will complete construction of WFO Charleston, WV and relocate to its new location. NWS will begin construction of the new WFO/RFC Slidell, New Orleans, LA location and begin the process of relocating the NEXRAD radar. NWS will also complete the installation of a municipal water line to WFO Gray, ME. NWS will continue with the NWS HQ data center infrastructure project, a multi-year effort, to address the aging IT architecture and equipment for the NWS. NWS will continue to focus resources on lifecycle management of government owned

assets to address deferred maintenance, real property disposal backlogs, data center consolidation, and improved space utilization in the National Capital Region. In FY 2023, NWS will complete the ongoing forced relocations (e.g. Topeka, KS), address deferred maintenance, field requirements, disposals, and NWS HQ infrastructure repairs as part of lifecycle management.

NWS cannot continue to support upgrades and improvements to NOAA's NWS facilities or to improve safety, functionality, and relocations with partners without continued support for construction and major repairs provided for in Facilities Construction and Major Repairs PAC.

Exhibit 3

Department of Commerce
National Oceanic and Atmospheric Administration
National Environmental Satellite, Data, and Information Service
Budget Estimates, Fiscal Year 2022

Executive Summary

For FY 2022, NOAA requests a total of $2,029,041,000 and 800 FTE/ 844 positions for the National Environmental Satellite, Data, and Information Service (NESDIS) including a net increase of $507,488,000 and 18 FTE/ 25 positions in program changes.

NESDIS (http://www.nesdis.noaa.gov/) provides secure and timely access to global environmental data from satellites and other sources to enhance the Nation's economy, security, environment, and quality of life. NESDIS works in close coordination with its NOAA Line Office partners the NWS, the NOS, the NMFS, and the OAR to help satisfy NOAA's climate and environmental mission service requirements. Information derived from the data that NESDIS collects supports investments and resource utilization in the economy, including: agriculture, transportation, energy, construction, emergency management, hazard mitigation, and other sectors. Billions of dollars in damage are incurred each year due to natural disasters and extreme climate and weather events such as wildfires, heatwaves, tornadoes, hurricanes, floods, and drought. In 2020, there were 22 weather, water, and climate disaster events with losses exceeding $1 billion each across the United States, directly resulting in 262 deaths and damages totaling more than $95.0 billion.[1] Additionally, 2020 was the sixth consecutive year (2015-2020) in which 10 or more billion-dollar weather and climate disaster events impacted the United States. National climate assessments warn that the fast-altering climate will amplify the number and severity of annual billion-dollar disasters. Decision makers, including businesses, communities, and governments, rely on NESDIS data and information to help them reduce the losses incurred by these destructive events, making it imperative to ensure the continuity of these satellite systems and the data they provide.

NESDIS manages the Nation's civil operational environmental satellites. These satellites are essential to the agency's integrated observing system, which is the foundation of the environmental intelligence that the agency provides. NESDIS maintains primary constellations of environmental satellites in the polar and geostationary orbits and in deep space at Lagrange point 1, directly along the sun-earth line. NESDIS satellite-based observations assist with disaster mitigation through the monitoring of severe weather, sea level rise, precipitation, fire and smoke, volcanic eruptions, dust storms, and other air quality issues. Along with managing NOAA's satellites in real time, NESDIS leverages Federal, partner, and commercial data sources to develop and distribute products and information from NOAA. NESDIS developed products and information underpin weather and other environmental forecasts, contributing to saving lives and property, and providing essential information to sustain and generate economic activity.

NOAA satellite observations, along with partner and commercial observations, provide uninterrupted global coverage critical for

[1] Credit National Centers for Environmental Information (NCEI): http://www.ncdc.noaa.gov/billions/

generating short-term and long-term weather forecasts. By integrating these observations with NESDIS's extensive environmental data archives at the National Centers for Environmental Information (NCEI), NESDIS provides valuable information and analyses of long-term monitoring and understanding of planetary environmental change. The preservation and continuous validation of long-term environmental data records support decision making, seasonal forecasting, climate monitoring, and climate modeling applications in both the private and public sectors. NESDIS is committed to the international effort to establish a global observing system that meets both the Nation and the world's need for environmental intelligence. A fully implemented global observing system, leveraging investments from NOAA and from multiple international contributors, is yielding increasingly accurate and reliable warnings of severe weather, climate change, and other environmental events in the United States and all around the world.

Next Generation Architecture

In 2015-2018 NESDIS conducted the NOAA Satellite Observing System Architecture (NSOSA) study, a comprehensive assessment of its next generation satellite architecture, which considered much more than just the satellite assets. NOAA reviewed the way it collects and manages requirements, and the industrial and IT systems trends that are essential elements of our work environment, and the anticipated user environment that our future systems will need to support.

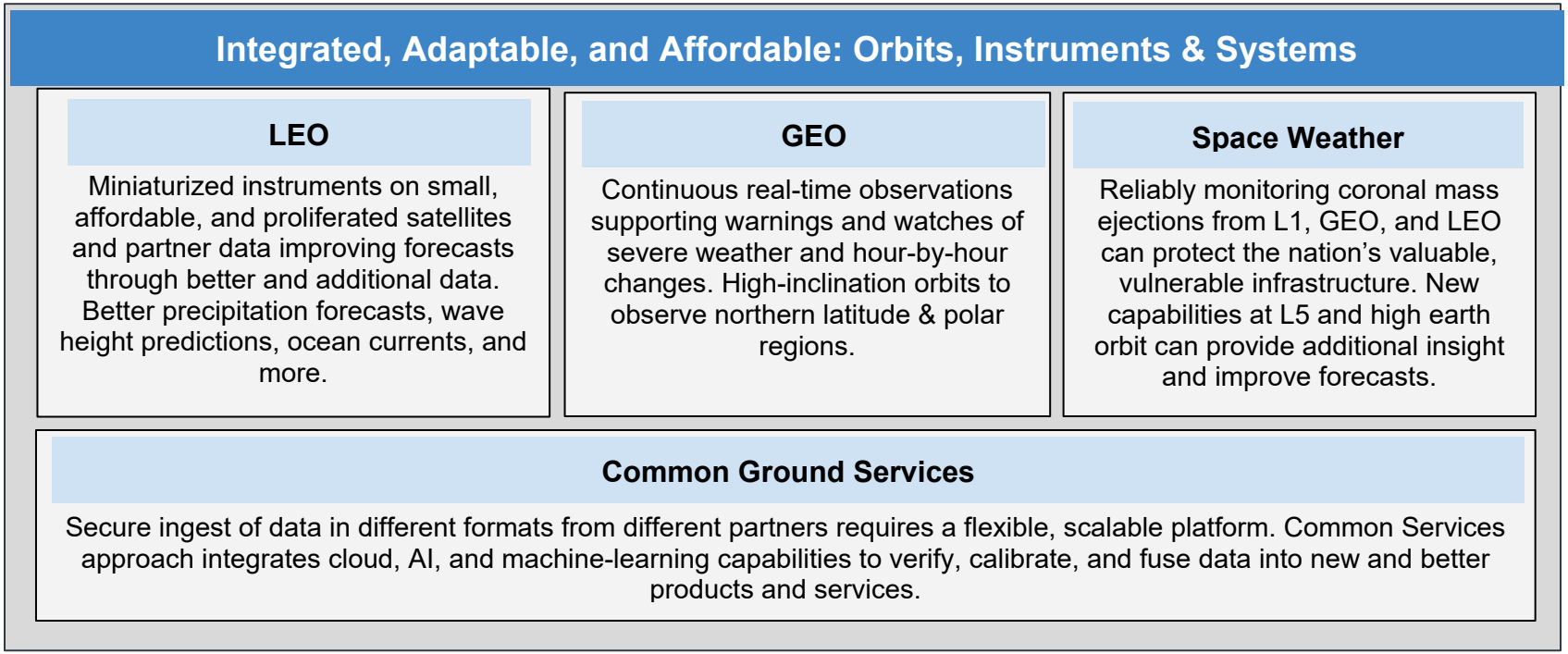
Within the evolving weather, climate, and environmental data landscape, we are seeing an unprecedented pace of technology advances (satellite and launch vehicle capabilities, artificial intelligence, quantum computing, and machine learning), which is opening access to space, increasing demand for timely integrated data and information, and advancing forecast modeling. In particular, there is an increased demand for timely and accurate observations and predictions of extreme weather events, and an intensified demand for environmental assessments informed by climate change assessments for forecasts to inform infrastructure investments. Commercial launch and remote sensing capabilities are emerging among the aerospace industry, along with an increasing vulnerability of our technological society to the effects of space weather.

NOAA is taking essential steps to operate effectively in this changing environment. Our vision is to create an integrated, digital understanding of our Earth environment that will allow our citizens to adapt and thrive. This observing system will provide advanced, real-time data critical to saving lives and protecting property as well as power increasingly sophisticated models that forecast climate change-driven weather patterns and environmental conditions never seen before, to provide our communities and users with information to manage their lives and investments into the future.

We envision a future observing system that will provide:

- A breadth of observations obtained from multiple viewpoints and organized into observation portfolios, including Low Earth Orbit (LEO), Geostationary Earth Orbit (GEO), and Space Weather Observations (SWO), where and when we need them to meet current expected future demands;
- A system featuring a mixture of small, medium and large satellites and instruments, including shorter development times, more frequent launches, and smaller and more capable instruments and satellites.
- A Common Ground Services approach to operate the evolving observing system, and integrated cloud, AI, and machine-learning capabilities to verify, calibrate, and fuse data into better products and services. This includes a flexible, scalable platform that enables secure ingest of partner data in different formats.
- A combination of assets, including NOAA-owned and managed, partner assets, commercial partnerships, and the purchase of data.
- A stable, predictable year-over-year budget allowing NOAA to pursue the most critical observations while making tradeoffs within and between observation portfolios to avoid cost growth that creates risk both to NESDIS as well as other NOAA line office priorities. NESDIS is committed to a flat $2.0 billion budget starting in FY 2022 with no outyear increases other than government-wide inflation assumptions.

As NESDIS continues adapting to the changing weather and environmental data landscape, future endeavors will focus on the continuity and efficient expansion of LEO, GEO, and SWO capabilities as well as the provision of common ground services for the secure ingest of data, without an increase in budget. Together, these four areas constitute the pillars of the NSOSA study implementation:



NESDIS will continue to adhere to and track the life cycle costs (LCCs) for major satellite programs such as the Geostationary Operational Environmental Satellite – R Series (GOES-R Series), Joint Polar Satellite System (JPSS), Polar Follow On (PFO), and Space Weather Follow On (SWFO). Since each of these represent established missions with unique visibility and stakeholders, NESDIS will keep the current reporting structure for the duration of these missions.

Budget Restructure Overview

The current NESDIS budget structure has enabled NESDIS to develop and successfully exploit individual NESDIS-owned and operated satellite missions. However, the challenge of the current budget structure is that resources, products, and offices are bound

to specific satellite missions, leading to:

- Higher acquisition costs due to an inability to balance risks across observation sets;
- Complex mission definition and authorization timelines that support large complex system with long development times;
- Information products tied to individual satellite platforms, making support of enterprise products and measurements tied to portfolio objectives, regardless of the data source, very difficult to develop; and.
- Missed opportunities to exploit partnerships and technology innovation.

NESDIS began evolving its budget structure in FY 2020 and 2021 to lay the groundwork for the architecture recommendations in accordance with the NSOSA study. Budget structure changes proposed in FY 2022 align with the investments requested for all our observing systems, including LEO, GEO, and SWO.

Next Generation Architecture & Budget Evolution

FY 2020	FY 2021	FY 2022
Creation of two Subactivities: Polar Weather Satellites (PWS) & Systems/Services Architecture and Engineering (SAE) Initiated studies to define next generation polar & geostationary satellite capabilities	Creation of Geostationary Earth Orbit (GEO) Subactivity to manage future geostationary observations, specifically the next generation geostationary satellite series Completed transfers to SAE	Creation of Low Earth Orbit (LEO) Subactivity to manage future polar observations, and Space Weather Observations (SWO) Subactivity to manage future space weather observations

In FY 2022, NOAA proposes to establish the **Low Earth Orbit (LEO)** Subactivity, which will set the stage for managing future polar and other low earth and medium earth orbit satellite observations as loosely coupled programs. See the Program Increase requests

for more detail on FY 2022 activities. Together with PWS, these observations primarily serve the requirements of NOAA's NWS numerical weather prediction models, providing the short-term (0-3 days), and mid-range (3-7 days) warnings of severe weather events critical for emergency managers and communities to make timely decisions to protect life and property. Future activities could also include assimilation of research observations from national and international partners or others for operational use.

In FY 2022, NOAA also proposes to establish the **Space Weather Observations (SWO)** Subactivity, which will manage the future space weather observations as loosely coupled programs. See the Program Increase requests for more detail on FY 2022 activities. Together with the Space Weather Follow On (SWFO), these observations create space weather warnings and forecasts, which are critical to protecting space assets, establishing space commerce, and protecting critical infrastructure, such as commercial banking, electrical power grid, and aviation operations.

NOAA is proposing to restructure the NESDIS budget to position itself to thrive in this new, heterogeneous observing system environment while enabling the organization to more efficiently make the tradeoffs to maintain a flat overall budget. The proposed combination of NOAA-owned and managed assets, partner assets, commercial partnerships, and the purchase of data will:

- Stabilize funding levels by allowing NESDIS to manage program performance and risk within the LEO, GEO, and SWO portfolios. We will institute budget performance evaluation to limit or prevent future cost growth. We will work with our Federal acquisition partners to lower the amount of funding required to be held for contingencies since risk will be shared across the portfolios.
- Collect and manage requirements at the observables level, rather than at the instrument or platform level. This will enable NESDIS to allocate resources to meet the NOAA mission requirement in the most efficient way and provide portfolio managers an incentive to reduce cost-intensive engineering changes to large satellite systems because unused reserves can be applied to newer, innovative (i.e. Next Generation) systems. Mission requirements still must be validated at the NOAA level.
- Leverage new public and private sector science, technical, and information sciences innovation – We will benefit from innovation at both ends of the information pipeline: in satellite technology at one end, and in information and product development and distribution at the other. There is a growing availability of commercial and partner data, as well as commercial and partner service delivery expertise. The budget restructure allows NOAA to commit resources and enter into contracts and partnerships proactively and timely.
- Be agile and responsive to public and private users' needs and expectations – Our ability to expand and diversify observations will allow users to limit the impact of severe weather events and environmental degradation events (harmful

algal blooms, flooding, fires, etc.), while fueling the commercial weather enterprise and environmental services sectors. Portfolio management will also pave the way for more rapid development and deployment of targeted observations in response to user needs or large satellite system anomalies, as mitigation plans can be implemented faster.

Budget Restructure Details

The proposed restructure will enable more effectively managed cost, schedule, and performance risk across the enterprise and increase program efficiencies to deliver space-based observations under a new architecture and paradigm. It reduces the overall number of Subactivities from 15 to 11, with 5 Subactivities remaining in ORF and 6 Subactivities in PAC. The NESDIS PAC Subactivity Crosswalk is displayed in Table 1 below:

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Table 1: NESDIS PAC Subactivity Crosswalk

PAC Appropriation	
Geostationary Systems – R (GOES-R)	**Geostationary Earth Orbit (GEO)**
Geostationary Extended Observations (GeoXO)	
Polar Weather Satellites (PWS)	**Low Earth Orbit (LEO)**
Cooperative Data and Rescue Services (CDARS)	
COSMIC 2/GNSS RO	
LEO Weather Satellites*	
POES Extension*	
Space Weather Next*	**Space Weather Observations (SWO)**
Space Weather Follow On (SWFO)	
Projects, Planning and Analysis (PPA) (SWO Base)	
Projects, Planning and Analysis (PPA) (CGS Base)	**Common Ground Services (CGS)**
Satellite Ground Services (SGS)	
Systems/Services Architecture & Engineering (SAE)	**Systems/Services Architecture & Engineering (SAE)**
Satellite CDA Facility	**Satellite CDA Facility**

* LEO Weather Satellites, POES Extension, and Space Weather Next are new Line Items requested in FY 2022 via Program Increases, but appear here for clarity.

Within each section of this budget request, Subactivities are further subdivided into Line Items to increase transparency and traceability in the NESDIS portfolios. Table 2 below identifies the FY 2021 Enacted amounts transferring to each new Line Item within the proposed FY 2022 budget restructure.

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Table 2: Crosswalk of NESDIS FY 2021 Enacted to FY 2022 Proposed Restructure Subactivities:

Current Structure													
GOES-R	334,500												
GEO		10,000											
PWS			657,835										
CDARS					14,400								
COSMIC 2/GNSS-RO						5,892							
PPA								6,606			9,339		
SWFO									108,115				
SGS											39,287		
SAE												38,500	
CDA Facility													2,450

(1) This table aligns the FY 2021 Enacted with the new FY 2022 Proposed Restructure. It does not include any of the Calculated ATBs, Technical Adjustments, or Operational Phase Transfers outlined in the Significant Adjustments section (NESDIS-12). Final post-adjustment FY 2020 base amounts are reflected in Exhibit 10 (NESDIS-20).

(2) LEO Weather Satellites, POES Extension, and Space Weather Next are new sub-PPAs in FY 2022 and therefore do not have FY 2021 Enacted amounts.

The benefits of organizing the NESDIS budget by thematic portfolios, rather than hardware-based portfolios, include:

- Maximizing the flexibility, responsiveness, and sustainability within each satellite portfolio;
- Eliminating duplicative management costs;
- More opportunities to improve program reserves posture by combining program funding to diversify risk pools; and,
- Creating additional critical synergies to protect against catastrophic events, such as impacts to supply chain, by minimizing time and management effort necessary to swap components, instruments and reserves. Spares, hardware, staff and other capacity that become available would be deployed seamlessly, efficiently and effectively to reduce cost and avoid schedule delays since funds would be contained within a single Subactivity.

Throughout the budget restructure and continuing with the program execution into the future, NESDIS will continue to adhere to and track the LCCs for current and future major satellite programs, such as GOES-R Series, JPSS, PFO, and SWFO. To ensure NESDIS maintains its commitment to the LCC, the amounts will continue to be separately reported.

Within each section of this budget request, Program Changes are aligned with specific Subactivities and Line Items (see Table 3).

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Table 3: NESDIS New Subactivity to New Line Item Crosswalk

Activity	Subactivity	Line Item	FY 2022 Program Changes*
Environmental Satellite Observing Systems	OSPO	OSPO	$10,981
	PDR&A	PDR&A	$20,652
	OSC	OSC	N/A
	USGEO	USGEO	$500
	NCEI	NCEI Base	$18,960
		Coastal Data Development	N/A
		Regional Climate Services	$4,000
Systems Acquisition	Geostationary Earth Orbit (GEO)	GOES-R	$1,000
		GeoXO	$455,000
	Low Earth Orbit (LEO)	PWS	($252,835)
		LEO Weather Satellites	$78,330
		CDARS	($13,100)
		COSMIC 2/GNSS RO	$2,208
		POES Extension	$20,000
	Space Weather Observations (SWO)	SWO Base	N/A
		SWFO	$38,785
		Space Weather Next	$55,000
	Common Ground Services (CGS)	CGS Base	N/A
		DACS	$25,007
	Systems/Services Architecture & Engineering (SAE)	Architecture, Requirements, and Planning	N/A
		Commercial Data Program	Commercial Weather Data Pilot: $5,000 Commercial Data Purchase: $13,000
		Joint Venture	$25,000

*FY 2022 Program Changes include non-narrative program changes for restorations related to the FY 2021 WCOSS and G550 reprogrammings.

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Significant Adjustments:

Inflationary Adjustments
NOAA's FY 2022 Base includes a net increase of $8,237,000 and 0 FTE/ 0 positions to account for the full funding requirement for certain inflationary adjustments to current programs for NESDIS activities. This includes the estimated 2022 civilian pay raise of 2.7 percent and military pay raise of 2.7 percent, as well as inflationary increases for labor and non-labor activities including benefits and rent charges from the General Services Administration.

Technical Adjustments (Transfers)
NOAA requests the following transfers for a net change of $0 and 0 FTE/ 0 positions to the agency:

From Office	Subactivity	To Office	Subactivity	Amount
NESDIS	Geostationary Systems – R (PAC)	NESDIS	Geostationary Earth Orbit (PAC)	$334,500,000 / 47 FTE/ 47 Positions
NESDIS	Polar Weather Satellites (PAC)	NESDIS	Low Earth Orbit (PAC)	$657,835,000 / 88 FTE/ 89 Positions
NESDIS	Cooperative Data and Rescue Services (PAC)	NESDIS	Low Earth Orbit (PAC)	$14,400,000 / 3 FTE/ 4 Positions
NESDIS	COSMIC-2 / GNSSRO (PAC)	NESDIS	Low Earth Orbit (PAC)	$5,892,000 / 2 FTE / 2 Positions
NESDIS	Projects, Planning, and Analysis (PAC)	NESDIS	Space Weather Observations (PAC)	$6,606,000 / 15 FTE/ 15 Positions
NESDIS	Space Weather Follow On (PAC)	NESDIS	Space Weather Observations (PAC)	$108,115,000 / 13 FTE/ 15 Positions
NESDIS	Projects, Planning, and Analysis (PAC)	NESDIS	Common Ground Services (PAC)	$9,339,000 / 0 FTE/ 0 Positions

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NOAA requests technical adjustments that will continue the next phase of the NESDIS budget restructure by completing the transfers to the LEO, GEO, and SWO Subactivities.

- NOAA requests to transfer $334,500,000, 47 FTE/ 47 positions, for support of the GOES-R Series program from the GOES-R Subactivity into the GEO Subactivity. The consolidation of these activities will support the management of geostationary earth orbit observations as a portfolio.
- NOAA requests to transfer $657,835,000, 88 FTE/ 89 positions, for support of the JPSS and PFO programs from the PWS Subactivity into the LEO Subactivity.
- NOAA requests to transfer $14,400,000, 3 FTE/ 4 positions, for support of the CDARS program from the CDARS Subactivity into the LEO Subactivity.
- NOAA requests to transfer $5,892,000, 2 FTE/ 2 positions, for support of the COSMIC-2/GNSSRO program from the COSMIC-2/GNSSRO Subactivity into the LEO Subactivity. The consolidation of PWS, CDARS, and COSMIC-2/GNSSRO activities will support the management of low earth orbit observations as a portfolio.
- NOAA requests to transfer $6,606,000, 15 FTE/ 15 positions, for support of future space weather observations from the PPA Subactivity into the SWO Subactivity.
- NOAA requests to transfer $108,115,000, 13 FTE/ 15 positions, for support of the SWFO program from the SWFO Subactivity into the SWO Subactivity.
- NOAA requests to transfer $9,339,000, 0 FTE/ 0 positions, from the PPA Subactivity into the CGS Subactivity. This transfer will allow NOAA to continue to securely ingest and generate products for Metop Second Generation (Metop SG) and partner data, and implement the ground system modifications necessary to process, distribute and archive Metop SG and other partner mission data.

From Office	Subactivity	To Office	Subactivity	Amount
NESDIS	Office of Satellite and Product Operations (ORF)	OMAO	NOAA Commissioned Officer Corps (ORF)	$277,000 / 2 FTE / 2 Positions
NESDIS	Product Development, Readiness & Application (ORF)	OMAO	NOAA Commissioned Officer Corps (ORF)	$276,000 / 2 FTE / 2 Positions

NOAA also requests to transfer $277,000 and 2 FTE / 2 Positions from the Office of Satellite and Product Operations PPA and $276,000 and 2 FTE / 2 Positions from the Product Development, Readiness & Application PPA to the OMAO NOAA Commissioned Officer Corps PPA PPA to allow for better alignment of funding and greater transparency over the full cost of the NOAA Corps. With this transfer, funding for all NOAA Corps personnel will reside within OMAO. This increases efficiency within the program by reducing

administrative burdens and allows NOAA to better manage personnel requirements consistent with the NOAA Corps Amendments Act of 2020.

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Life cycle costs: The following tables provide the details of the total LCC of NOAA satellites that have a required base funding level of over $250 million.

GOES-R Series LCC ($ in thousands):

GOES-R Series LCC	2021 & Prior*	2022	2023	2024	2025	2026	CTC	Total
GOES-R Series LCC (PAC & ORF)	**9,412,459**	**369,400**	**309,900**	**306,400**	**158,400**	**132,400**	**1,011,128**	**11,700,087**
Procurement, Acquisition, and Construction (PAC)								
Total PAC	**9,242,959**	**335,500**	**276,000**	**272,500**	**124,500**	**98,500**	**672,128**	**11,022,087**
GOES-R Series	9,242,959	335,500	276,000	272,500	124,500	98,500	672,128	11,022,087
Operations, Research and Facilities (ORF)								
Total ORF	**169,500**	**33,900**	**33,900**	**33,900**	**33,900**	**33,900**	**339,000**	**678,000**
Office of Satellite and Product Operations (OSPO)	132,450	26,490	26,490	26,490	26,490	26,490	264,900	529,800
Product Development, Readiness & Application (PDR&A)	30,000	6,000	6,000	6,000	6,000	6,000	60,000	120,000
National Centers for Environmental Information (NCEI)	7,050	1,410	1,410	1,410	1,410	1,410	14,100	28,200

* The FY 2021 & Prior column has been adjusted to account for the FY 2021 enacted amount as well as any reductions for NOAA reprogramming and deobligations.

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Polar Weather Satellites (PWS; JPSS and PFO) LCC* ($ in thousands):

PWS^^		2021 & Prior**	2022	2023	2024	2025	2026	CTC	Total
Total PWS (PAC & ORF)		**12,613,724**	**425,000**	**425,000**	**425,000**	**425,000**	**425,000**	**3,421,301**	**18,160,025**
JPSS LCC (PAC & ORF)		10,581,565	200,000	200,000	125,000	81,500	0	134,060^	11,322,125
PFO LCC (PAC & ORF)		2,032,159	225,000	225,000	300,000	343,500	425,000	3,287,241	6,837,900
Procurement, Acquisition and Construction (PAC)									
Total PAC		**12,573,724**	**405,000**	**405,000**	**405,000**	**405,000**	**425,000**	**3,421,301**	**18,040,025**
Subactivity	**Program**								
Polar Weather Satellites	JPSS	10,541,565	180,000	180,000	105,000	61,500	0	134,060^	11,202,125
	PFO	2,032,159	225,000	225,000	300,000	343,500	425,000	3,287,241	6,837,900
Operations, Research and Facilities (ORF)									
Total ORF		**40,000**	**20,000**	**20,000**	**20,000**	**20,000**	**0**	**0**	**120,000**
Subactivity	**Program**								
Office of Satellite and Product Operations	JPSS	40,000	20,000	20,000	20,000	20,000	0	0	120,000

* Outyears are estimates. Future requests will be based on current needs and requirements. Future year funding assumes $425 million per year for PWS from FY 2022-FY 2025, allocated efficiently between JPSS and PFO while remaining at or under each program's LCC baseline in total.

** The FY 2021 & Prior column accounts for the FY 2021 enacted amounts as well as any reductions for deobligations.

^ The difference between the requested budget through the end of the JPSS program and the LCC reflects a projected underrun. This projection is based on recent program execution performance, and is subject to reevaluation as conditions and circumstances warrant. See the PWS Program Change Summary (Exhibit 13) for more details.

^^ PFO reduction of $735 million was identified and accepted by the program, as detailed within the PWS Program Change Decrease.

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SWFO LCC* ($ in thousands):

SWFO LCC	**2021 & Prior****	**2022**	**2023**	**2024**	**2025**	**2026**	**CTC**	**Total**
SWFO LCC	**213,815**	**146,900**	**136,200**	**97,200**	**41,200**	**22,300**	**35,185**	**692,800**
Procurement, Acquisition, and Construction (PAC)								
Total PAC	**213,815**	**146,900**	**136,200**	**97,200**	**41,200**	**22,300**	**35,185**	**692,800**
SWFO	213,815	146,900	136,200	97,200	41,200	22,300	35,185	692,800

* Outyears are estimates. Future requests will be based on current needs and requirements. Therefore, the PAC profile will be updated on an annual basis.
** The FY 2021 & Prior column has been adjusted to account for the FY 2021 President's Budget request.

Exhibit 3T

Department of Commerce
Operating Unit of Commerce
Operations, Research, and Facilities
TRANSFER CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Environmental Satellite Observing Systems
Subactivity: Office of Satellite and Product Operations (ORF) transfer to NOAA Commissioned Officer Corps (ORF)

	Object Class	2021 Enacted	2022 Transfer	2022 Base*
11.1	Full-time permanent compensation	37,714	0	38,574
11.3	Other than full-time permanent	0	0	0
11.5	Other personnel compensation	4,000	0	4,000
11.7	NOAA Corps	277	(277)	0
11.9	Total personnel compensation	41,991	(277)	42,574
12	Civilian personnel benefits	12,458	0	13,858
13	Benefits for former personnel	0	0	0
21	Travel and transportation of persons	138	0	138
22	Transportation of things	184	0	186
23	Rent, communications, and utilitites	0	0	0
23.1	Rental payments to GSA	9,321	0	9,754
23.2	Rental Payments to others	0	0	0
23.3	Communications, utilities and misc charges	2,537	0	2,656
24	Printing and reproduction	52	0	52
25.1	Advisory and assistance services	36,800	0	37,473
25.2	Other services from non-Federal sources	46,814	0	47,704
25.3	Other goods and services from Federal sources	33,074	0	33,678
25.4	Operation and maintenance of facilities	0	0	0
25.5	Research and development contracts	1,200	0	1,221
25.6	Medical care	0	0	0
25.7	Operation and maintenance of equipment	0	0	0
25.8	Subsistence and support of persons	0	0	0
26	Supplies and materials	1,242	0	1,269
31	Equipment	888	0	930
32	Lands and structures	0	0	0
33	Investments and loans	0	0	0
41	Grants, subsidies and contributions	419	0	419
42	Insurance claims and indemnities	0	0	0
43	Interest and dividends	0	0	0
44	Refunds	0	0	0
99	Total obligations	187,118	(277)	191,912

Exhibit 3T

Department of Commerce
Operating Unit of Commerce
Operations, Research, and Facilities
TRANSFER CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Environmental Satellite Observing Systems
Subactivity: Product Development, Readiness and Application (ORF) transfer to NOAA Commissioned Officer Corps (ORF)

	Object Class	2021 Enacted	2022 Transfer	2022 Base*
11.1	Full-time permanent compensation	11,979	0	12,253
11.3	Other than full-time permanent	0	0	0
11.5	Other personnel compensation	196	0	196
11.7	NOAA Corps	276	(276)	0
11.9	Total personnel compensation	12,451	(276)	12,449
12	Civilian personnel benefits	4,252	0	4,784
13	Benefits for former personnel	0	0	0
21	Travel and transportation of persons	118	0	118
22	Transportation of things	4	0	4
23	Rent, communications, and utilitites	0	0	0
23.1	Rental payments to GSA	2,833	0	2,966
23.2	Rental Payments to others	0	0	0
23.3	Communications, utilities and misc charges	45	0	47
24	Printing and reproduction	20	0	21
25.1	Advisory and assistance services	306	0	314
25.2	Other services from non-Federal sources	2,429	0	2,465
25.3	Other goods and services from Federal sources	298	0	306
25.4	Operation and maintenance of facilities	0	0	0
25.5	Research and development contracts	2,970	0	3,050
25.6	Medical care	0	0	0
25.7	Operation and maintenance of equipment	0	0	0
25.8	Subsistence and support of persons	0	0	0
26	Supplies and materials	20	0	22
31	Equipment	143	0	147
32	Lands and structures	0	0	0
33	Investments and loans	0	0	0
41	Grants, subsidies and contributions	2,398	0	2,398
42	Insurance claims and indemnities	0	0	0
43	Interest and dividends	0	0	0
44	Refunds	0	0	0
99	Total obligations	28,287	(276)	29,091

Department of Commerce
National Oceanic and Atmospheric Administration
PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS
(Dollar amounts in thousands)

Comparison by Subactivity		2020 Actuals		2021 Enacted		2022 Base		2022 Estimate		Increase/Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE (NESDIS)											
Office of Satellite and Product	Pos/BA	274	165,334	293	187,118	291	191,912	291	202,893	0	10,981
Operations (OSPO)	FTE/OBL	262	166,553	287	187,118	285	191,912	285	202,893	0	10,981
Product Development, Readiness &	Pos/BA	87	28,187	88	28,287	86	29,091	89	49,743	3	20,652
Application (PDR&A)	FTE/OBL	83	33,395	87	28,287	85	29,091	87	49,743	2	20,652
Commercial Remote Sensing	Pos/BA	5	1,765	0	0	0	0	0	0	0	0
Regulatory Affairs (CRSRA)	FTE/OBL	5	1,582	0	0	0	0	0	0	0	0
Office of Space Commerce (OSC)	Pos/BA	4	2,294	20	10,000	20	10,000	20	10,000	0	0
	FTE/OBL	5	2,667	11	10,000	11	10,000	11	10,000	0	0
U.S. Group on Earth Observations	Pos/BA	0	497	0	500	0	500	0	1,000	0	500
(USGEO)	FTE/OBL	0	510	0	500	0	500	0	1,000	0	500
National Centers for Environmental	Pos/BA	167	60,963	186	63,040	186	65,126	186	88,086	0	22,960
Information (NCEI)	FTE/OBL	152	62,594	172	63,040	172	65,126	172	88,086	0	22,960
TOTAL NESDIS - ORF	**Pos/BA**	**537**	**259,040**	**587**	**288,945**	**583**	**296,629**	**586**	**351,722**	**3**	**55,093**
	FTE/OBL	**507**	**267,301**	**557**	**288,945**	**553**	**296,629**	**555**	**351,722**	**2**	**55,093**

Exhibit 10

Department of Commerce
National Oceanic and Atmospheric Administration
PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS
(Dollar amounts in thousands)

Comparison by Subactivity		2020 Actuals		2021 Enacted		2022 Base		2022 Estimate		Increase/Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE (NESDIS)											
Geostationary Earth Orbit (GEO)	Pos/BA	0	0	0	10,000	47	344,500	53	800,500	6	456,000
	FTE/OBL	0	0	0	10,000	47	344,500	51	800,500	4	456,000
Geostationary Systems-R (GOES-R)	Pos/BA	56	302,575	47	334,500	0	0	0	0	0	0
	FTE/OBL	44	302,248	47	334,500	0	0	0	0	0	0
Low Earth Orbit (LEO)	Pos/BA	0	0	0	0	95	678,127	99	512,730	4	(165,397)
	FTE/OBL	0	0	0	0	93	678,127	95	512,730	2	(165,397)
Polar Weather Satellites (PWS)	Pos/BA	106	734,500	89	657,835	0	0	0	0	0	0
	FTE/OBL	88	736,484	88	657,835	0	0	0	0	0	0
Cooperative Data and Rescue Services (CDARS)	Pos/BA	4	11,323	4	14,400	0	0	0	0	0	0
	FTE/OBL	3	14,595	3	14,400	0	0	0	0	0	0
COSMIC-2/GNSS RO	Pos/BA	2	5,876	2	5,892	0	0	0	0	0	0
	FTE/OBL	2	6,813	2	5,892	0	0	0	0	0	0
Space Weather Observations (SWO)	Pos/BA	0	0	0	0	30	114,721	40	208,506	10	93,785
	FTE/OBL	0	0	0	0	28	114,721	36	208,506	8	93,785
Projects, Planning and Analysis (PPA)	Pos/BA	20	30,828	15	15,945	0	0	0	0	0	0
	FTE/OBL	17	33,710	15	15,945	0	0	0	0	0	0
Space Weather Follow On (SWFO)	Pos/BA	8	63,928	15	108,115	0	0	0	0	0	0
	FTE/OBL	9	63,601	13	108,115	0	0	0	0	0	0
Common Ground Services (CGS)	Pos/BA	37	54,103	35	39,287	35	48,626	35	73,633	0	25,007
	FTE/OBL	39	52,608	34	39,287	34	48,626	34	73,633	0	25,007
Systems/Services Architecture & Engineering (SAE)	Pos/BA	13	33,506	29	38,500	29	38,500	31	81,500	2	43,000
	FTE/OBL	18	29,160	27	38,500	27	38,500	29	81,500	2	43,000

Department of Commerce
National Oceanic and Atmospheric Administration
PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS
(Dollar amounts in thousands)

Comparison by Subactivity		2020 Actuals		2021 Enacted		2022 Base		2022 Estimate		Increase/Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE (NESDIS)											
Satellite CDA Facility	Pos/BA	0	2,119	0	2,450	0	2,450	0	2,450	0	0
	FTE/OBL	0	2,878	0	2,450	0	2,450	0	2,450	0	0
Transfer to OIG	Pos/BA	0	0	0	(2,000)	0	(2,000)	0	(2,000)	0	0
	FTE/OBL	0	0	0	(2,000)	0	(2,000)	0	(2,000)	0	0
TOTAL NESDIS - PAC	**Pos/BA**	**246**	**1,238,668**	**236**	**1,224,924**	**236**	**1,224,924**	**258**	**1,677,319**	**22**	**452,395**
	FTE/OBL	**220**	**1,242,097**	**229**	**1,224,924**	**229**	**1,224,924**	**245**	**1,677,319**	**16**	**452,395**
TOTAL NESDIS	**Pos/BA**	**783**	**1,497,708**	**823**	**1,513,869**	**819**	**1,521,553**	**844**	**2,029,041**	**25**	**507,488**
	FTE/OBL	**727**	**1,509,398**	**786**	**1,513,869**	**782**	**1,521,553**	**800**	**2,029,041**	**18**	**507,488**

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Environmental Satellite Observing System

Goal Statement

NOAA manages environmental satellites and related ground systems to provide timely and accurate environmental data and products for forecasts and warnings to ensure the safety of U.S. citizens, public property, and infrastructure.

Base Program

NOAA's Environmental Satellite Observing Systems activities are to:

- Maintain and operate a system of polar-orbiting satellites which provide global imaging and sounding for medium and long-range weather forecasting and climate analysis crucial to numerical weather prediction models.
- Maintain and operate a system of geostationary satellites to provide near-continuous environmental observations of the Earth's Western Hemisphere critical for weather forecasting and severe storm tracking.
- Supply data and operational products to the public and decision-makers.
- Operate and maintain the mission control center for the search and rescue satellite system.

The Environmental Satellite Observing System activity includes the following Subactivities: Office of Satellite and Product Operations; Product Development, Readiness and Application; and U.S. Group on Earth Observation. Detailed operating objectives for each Subactivity are described below.

Statement of Operating Objectives

Office of Satellite and Product Operations (OSPO)
Schedule and Milestones:
FY 2022 – FY 2026

- 24/7 operations, collision, and anomaly support for NOAA geostationary, low earth orbiting, and space weather satellites; and, backup operations for Jason Continuity of Service (Jason CS) and Metop satellites
- Process and distribute environmental data from NOAA geostationary and low earth orbiting satellites; Metop A, B, C, and EUMETSAT Polar System Second Generation (EPS-SG); and other international partner satellites
- Complete the acceptance into operation of the SARSAT Program's Phased Array Antenna Medium Earth Orbit Local User Terminal (MEOLUT) ground station in New Mexico and associated test system at NSOF

- Continuously monitor and annual penetration testing of all NOAA information technology (IT) systems
- Enhance common processes in response to IT Security events or incidents including moving NESDIS non-satellite control high impact networks into NOAA OCIO's secure active directory
- Maintain SARSAT infrastructure

FY 2022
- Accept handover of GOES-T after completion of on-orbit testing

FY 2023
- Accept handover of JPSS-2 after completion of on-orbit testing

FY 2025
- Accept handover of SWFO after completion of on-orbit testing
- Accept handover of GOES-U after completion of on-orbit testing

Deliverables:
- Delivery of satellite data and products to users
- Engineering support for NOAA on-orbit satellites
- Support search and rescue antenna performance checks on POES (NOAA-19) and Metop A and B
- Maintain SARSAT infrastructure

Product Development, Readiness & Application (PDR&A)
Schedule and Milestones:
FY 2022 – FY 2026
- For GOES-T, complete pre-launch preparations and post launch calibration and validation (cal/val), and transition to routine cal/val, algorithm maintenance, and anomaly resolution
- For Metop-SG A1 and B1 satellites instruments, complete algorithms, pre-launch readiness, support initial calibration, conduct NOAA initial product validation, and transition to routine algorithm maintenance and anomaly resolution, and support routine calibration maintenance
- For ongoing commercial GNSS-RO, provide science input data to evaluate commercial offerings and provide transition support and ongoing quality assessment for purchased data
- For CWDP Round 3 and 4, provide science input / support / evaluation depending on commercial sector readiness
- Deliver enterprise algorithms for operational implementation in cloud computing to enable transition off of legacy algorithms processing in legacy ground product generation

- For JPSS-2 sensors and products, complete initial cal/val, and transition to routine cal/val, algorithm maintenance, and anomaly resolution
- Develop requirements, algorithms, test and verify then transition to operations and routine maintenance/anomaly resolution for updated LEO/GEO blended products incorporating Metop-SG
- Develop requirements, algorithms, test and verify then transition to operations and routine maintenance/anomaly resolution for Geostationary ring and LEO/GEO blended products incorporating Meteosat Third Generation
- Complete GOSAT AMSR-3 algorithms, and initial cal/val and look up table delivery and transition to routine calibration, validation, algorithm maintenance and anomaly resolution
- Complete final validation of Sentinel-6 Michael Freilich
- For Sentinel-6B perform pre-launch development, post-launch evaluation, initial validation of products, implement work packages in 6-month commissioning phase with Sentinel-6 Michael Freilich, and final validation of Sentinel-6B, transition of both to routine cal/val maintenance and anomaly resolution
- For GOES-U, complete pre-launch preparations and post launch cal/val and transition to routine calibration, validation, algorithm maintenance and anomaly resolution
- For JPSS-3, complete pre-launch calibration/validation, look up tables and Integrated Cal/Val System readiness

Deliverables:

- Maintain algorithms and data product validation to translate raw data into useful products meeting quality requirements for GOES-R Series, Sentinel-6, POES, Metop, COSMIC, CWDP, EOS, Himawari, Meteosat, Sentinel, Scatsat, and lead for JPSS series and GCOM-W, GOSAT AMSR 3, Metop-SG, Sentinel 4 and 5
- Conduct pre-launch initial instrument calibration and product validation for satellites to be launched, and complete initial instrument calibration and product validations for recently launched satellites
- Perform suitability assessment, and validation of non-NOAA data sources for NOAA use, and incorporate non-NOAA data flows into NOAA enterprise algorithms and NOAA models (in cooperation with NWS, OAR, NOS)
- Provide science coordination with national and international partners
- Provide observing requirements inputs to future satellite sensor and mission studies and support their optimization for NOAA mission needs and subsequent development
- Provide user services including training, consultation, risk reduction, help, complementary dissemination services, and integrated platforms such as CoastWatch/OceanWatch
- Full Implementation of the Synthetic Aperture Radar Operational Processing System supporting multiple aquatic and terrestrial applications

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Office of Space Commerce (OSC):
Schedule and Milestones:
FY 2022
- Develop architecture and requirements for initial pilot, Open Architecture Data Repository (OADR)
- Perform assessments and analyses of data and processing requirements for delivering high quality space traffic management (STM) services
- Planning and execution of end-to-end functional demonstrations of STM capabilities
- Issue licenses and other license actions within statutory timelines (60 days)
- Conduct inspections of operational ground stations

FY 2023-FY 2026
- Continue to support STM through assessments, advanced analytics developments, and end-to-end functional demonstrations of STM capabilities
- Further develop STM Open Architecture Data Repository capabilities as a reference design for possible transition to operations
- Issue licenses and other license actions within statutory timelines (60 days)
- Conduct inspections of operational ground stations

Deliverables:
- Conduct requirements definition, analysis of alternatives, and demonstration of capabilities to support the commercial industry.

U.S. Group on Earth Observations (USGEO): See the Program Change for the proposed schedule, milestones, deliverables, performance goals and measurement data, and the budget profile.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Explanation and Justification

Comparison by Subactivity		2020 Actuals Personnel	2020 Actuals Amount	2021 Enacted Personnel	2021 Enacted Amount	2022 Base Program Personnel	2022 Base Program Amount
Office of Satellite and Product Operations (OSPO)	Pos/BA	274	165,334	293	187,118	291	191,912
	FTE/OBL	262	166,553	287	187,118	285	191,912
Product Development, Readiness & Application (PDR&A)	Pos/BA	87	28,187	88	28,287	86	29,091
	FTE/OBL	83	33,395	87	28,287	85	29,091
Commercial Remote Sensing Regulatory Affairs (CRSRA)	Pos/BA	5	1,765	0	0	0	0
	FTE/OBL	5	1,582	0	0	0	0
Office of Space Commerce (OSC)	Pos/BA	4	2,294	20	10,000	20	10,000
	FTE/OBL	5	2,667	11	10,000	11	10,000
U.S. Group on Earth Observations (USGEO)	Pos/BA	0	497	0	500	0	500
	FTE/OBL	0	510	0	500	0	500
Total Environmental Satellite Observing Systems	Pos/BA	370	198,077	401	225,905	397	231,503
	FTE/OBL	355	204,707	385	225,905	381	231,503

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Office of Satellite and Product Operations (OSPO) (http://www.ospo.noaa.gov/): OSPO acquires and delivers accurate, timely, and reliable satellite observations and integrated products from NOAA-operated, commercially-acquired, and domestic and international non-NOAA satellites. OSPO provides support during launch, activation, and evaluation of recently launched satellites of interest; satellite health and safety monitoring, satellite operations, and data acquisition to meet user needs; and, assessment of satellite and ground station anomalies and support to appropriate recovery actions for those anomalies.

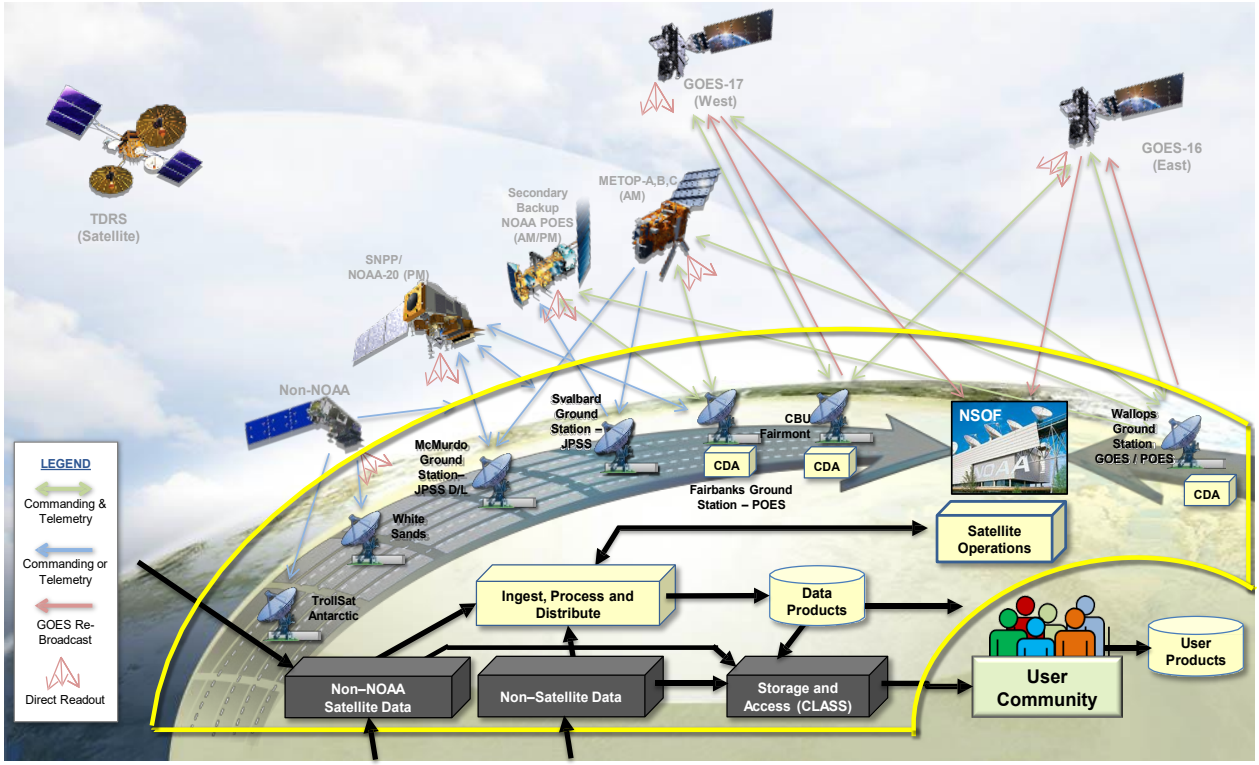
OSPO manages and directs NOAA's command and control of the suite of on-orbit satellites that supply the environmental data critical for developing weather and climate products used daily by federal and state agencies, industry, and citizens across the Nation. To this end, OSPO works with NOAA's National Weather Service (NWS) to supply the satellite data that makes up over 90 percent of the information used in their numerical weather prediction models. OSPO collects space weather data, which is used to protect the aviation and electric power industries, Global Positioning System, radio communications, and satellites. OSPO provides satellite transmission services that provide operational data, derived products, and support for the worldwide direct readout community who are given free, unrestricted access to the scientific data from NOAA satellites. OSPO is also the United States operator for the international Search and Rescue Satellite-Aided Tracking (SARSAT) system, utilizing NOAA satellites, dedicated to saving persons in distress on land or water.

Overall, OSPO:

- Maintains and operates a system of polar-orbiting satellites which provide global imaging and sounding for medium and long-range weather forecasting and climate analysis crucial to numerical weather prediction models;
- Maintains and operates a system of geostationary satellites to provide near-continuous environmental observations of the Western Hemisphere critical for weather forecasting and severe storm tracking;
- Performs long-term maintenance to preserve the form, fit, and function of legacy ground systems;
- Performs on-orbit anomaly support for the legacy Geostationary Operational Environmental Satellites (GOES) and Polar-orbiting Operational Environmental Satellites (POES) series of satellites, Deep Space Climate Observatory (DSCOVR), and Jason-3;
- Supplies data and operational products to the public and decision-makers;
- Operates a continuous Data Collection System (DCS) service, providing data relay services for multiple federal and commercial users; and,
- Operates and maintains the U.S. Mission Control Center for the search and rescue satellite system.

In FY 2021, OSPO operated and supported a total of 18 on-orbit satellites including: legacy GOES and POES; Suomi National Polar-orbiting Partnership (Suomi NPP) and Joint Polar Satellite System (JPSS) satellites; GOES-R Series satellites; DSCOVR; Jason-3; as well as other non-NOAA operational environmental satellites. OSPO's IT Security implements vulnerability management against the

latest threats on satellite ground systems to lower the operational risk, which ensures continuity of critical satellite data flow to key customers such as NOAA's NWS.



Maintaining the operations and data acquisition from NOAA and our partner satellites is a 24/7 process. OSPO manages and directs operation of the central ground facilities which ingest, process, and distribute environmental satellite data and derived products to users.

OSPO sustains NOAA's legacy ground systems through capability enhancements; periodic technology refresh, including hardware and software upgrades; and IT security. OSPO currently sustains ground segments supporting the following satellite constellations: GOES; POES; Jason-3; DSCOVR; and, Global Navigation Satellite System (GNSS) Radio Occultation (RO) partner missions. OSPO also

supports elements of the GOES-R Series ground segment and sustains ground system antennas, which send and receive data to and from satellites.

OSPO supports:

- The NOAA Satellite Operations Facility (NSOF) for NOAA's 24 hours a day, 365 days a year, environmental satellite operations. Through NSOF, NOAA operates the ground systems that command, control, and acquire data from on-orbit satellites. Each day, NSOF processes more than 25 terabytes of environmental satellite raw data from on-orbit DOD, NOAA, and non-NOAA satellites. In addition to satellite operations, NSOF provides environmental data used to develop weather and climate products, as well as other information products used daily by industry and citizens across the Nation;
- The Satellite Operations Control Center and Environmental Satellite Processing Center, which serve as the vital link between satellites and users by providing uninterrupted availability of critical observations and real-time delivery of satellite data to product processing centers. These include the Command and Data Acquisition Stations at Wallops, Virginia, and Fairbanks, Alaska, and the consolidated backup at Fairmont, West Virginia;
- The Comprehensive Large Array-data Stewardship System, providing the long-term preservation of and access to the ever-increasing input of data from observing systems (e.g., satellites, radar, and other ground observations);
- The GOES Data Collection System and Argos Data Collection and Location Systems used by researchers, governmental and environmental organizations worldwide;
- The U.S. SARSAT system is an integral part of the Cospas-Sarsat Program, which is an international humanitarian search and rescue system that detects and relays distress signals from mariners, aviators, and recreational enthusiasts, anywhere in the world, to Mission Control Centers that coordinate with local rescue authorities to rescue the person(s) in distress. NOAA coordinates U.S. participation in the international Cospas-Sarsat Program, and operates and maintains the U.S. Mission Control Center and the Local User Terminals, which are the satellite receiving ground stations that receive emergency beacon distress alerts; and,
- The NOAA instruments on the Metop-B and Metop-C satellites by providing data processing and distribution of environmental data, as well as anomaly support.

Product Development, Readiness & Application (PDR&A) (http://www.star.nesdis.noaa.gov/star/index.php): PDR&A provides the scientific and technical capabilities that enable state-of-the-art satellite-based information to be delivered to NOAA and its partners. PDR&A increases forecast prediction capabilities using advanced satellite assimilation methods to accelerate and improve the quantitative use of research and operational satellite data in weather, ocean, climate, and environmental analysis and prediction systems. PDR&A capitalizes on NOAA's investment in the acquisition and management of the Nation's operational environmental satellites to 1) transform raw observations and data feeds into information products and services to support NOAA's mission; 2)

develop instrument and future mission observational requirements; 3) develop NOAA sensors and missions, including transition to operations; 4) maintain and sustain satellite data quality; and 5) provide user support, training, and distribution services. PDR&A funds the core capabilities of the Center for Satellite Applications and Research (STAR) and post operational phase transition support for GOES-R Series and Jason.

Through these capabilities STAR implements funding from NESDIS and other programs to:

- Conduct comprehensive and rigorous calibration/validation of all data in NOAA's satellite operations and to the extent necessary for partner and commercial satellite data sources to ensure the accuracy of satellite products to meet user performance requirements throughout mission life cycles, collaborates with other satellite data providers to foster consistency and usability;
- Support resolution of instrument anomalies either pre-launch or on-orbit through compensating changes to data product algorithms and tables;
- Working with internal information end users from NOAA's Line Offices, combines NOAA's environmental satellite measurements with other available information to create fit for purpose blended data, products, and services to meet NOAA's mission requirements;
- Provide characterization, support, testing, assimilation technology and quality assurance for critical real time satellite data and information products to meet the needs of NOAA's National Weather Service, NOAA's other line offices, and partner U.S. Government and international agencies. These products feed forecast models and operational forecasts;
- Provide non-real time data and information products to meet the needs of NOAA's line offices and partner U.S. Government and international agencies for model validation, training and user readiness, retrospective assessments, and long term data sets improving environmental understanding;
- Through research and development into remote-sensing solutions to meet NOAA mission goals and science challenges, improve NOAA services that protect lives, property, and livelihoods by addressing challenges such as increasing lead times for severe weather warnings, severe ocean condition warnings, and providing accurate warnings of related environmental phenomena such as floods, droughts, volcanic ash, toxic algal blooms, sea ice, water quality, etc.;
- Support users through training, science support, risk reduction, consulting, enterprise distribution services complementing satellite product operations, testing and validation, and support to archive services; and,
- Support future NOAA and partner satellite instrument and mission requirements development to meet NOAA mission objectives, and support development through transition to operations of NOAA instruments and missions.

STAR's work supports Executive Order (EO) 14008, Tackling the Climate Crisis at Home and Abroad, and EO 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis, by conducting scientific research and developing new

satellite products to improve and expand the use of satellite data for monitoring global meteorological, climatological, and environmental conditions. The products STAR develops are used widely within NOAA's weather, climate, and environmental monitoring and prediction systems and include products ranging from fire, aerosols, and atmospheric temperature to snow and ice cover, ocean color and temperature, and tropical cyclones. STAR's work in calibrating and validating satellite instruments and developing new products are integral to improving the quality and quantity of climate observations, analysis, interpretation, and archives by maintaining a consistent climate record and improving our understanding of why changes are occurring.

Office of Space Commerce (OSC): The office has separate and distinct advocacy and regulatory functions.

- OSC: the principal unit for space commerce policy activities within the Department of Commerce. Its mission is to foster the conditions for the economic growth and technological advancement of the U.S. commercial space industry. OSC represents the Department in interagency work and advocates for industry within the executive branch of the Federal Government. OSC has begun critical infrastructure implementation, critical planning requirements, and initial pilot activities to improve SSA to achieve a fully operational capability to provide commercial and international space situational services by January 1, 2024 when, per 10 U.S. Code § 2274, the DoD will no longer be required to provide these services except in incidence of national security.

- Commercial Remote Sensing Regulatory Affairs: continues coordination and facilitation of the Advisory Committee on Commercial Remote Sensing (ACCRES), which provides information, advice, and recommendations to the Under Secretary of Commerce for Oceans and Atmosphere on matters relating to the U.S. satellite commercial remote sensing industry and NOAA's activities. It also conducts activities for implementing the regulations on private remote sensing space systems per 15 CFR Part 960. These activities include issuing and modifying licenses to operate remote sensing systems, monitoring regulatory compliance of licensed systems, and monitoring global availability of remote sensing data made available by foreign sources.

U.S. Group on Earth Observations (USGEO): USGEO is a subcommittee of the White House National Science and Technology Council, with co-chairs from the Office of Science and Technology Policy, the National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration, and the U.S. Geological Survey. GEO is a partnership of 113 governments and more than 150 participating organizations and associates from the public and private sectors at international, regional, and national levels with a mission to coordinate comprehensive and sustained Earth observations. The United States is a founding member of GEO, and NOAA serves as the United States Principal to GEO. USGEO provides program resources to support the U.S. Group on Earth Observations and supports NOAA's participation as part of the U.S. membership in the international Group on Earth Observations (GEO) organization. Global environmental and resource issues are among the great global challenges of our time, including mitigating and

adapting to climate change and supporting sustainable development and resilience of global communities in the face of public health crisis, stress on food systems and biodiversity, and environmental degradation. Integrated Earth observations from public and private sources, technological advances in the application of Artificial Intelligence and Machine Learning, cloud computing and data analytics are essential tools for addressing these challenges. USGEO is a key forum for international engagement and cooperation on Earth observations. USGEO fulfills legislative requirements to deliver a National Plan for Civil Earth Observations and its associated implementation plan. One of the National Plan's objectives is to coordinate the United States' participation and representation to GEO. Specifically:

- Enhance international cooperation to enable more robust Earth observation architectures;
- Work through international frameworks to increase access to data from overseas sources;
- Promote and advance the United States' interests; and,
- Strengthen global and regional leadership through engagement in the intergovernmental GEO and advancement of the western hemisphere regional GEO community, AmeriGEO.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Office of Satellite and Product Operations (OSPO)	Pos./BA	291	191,912	291	199,412	0	7,500
	FTE/OBL	285	191,912	285	199,412	0	7,500

Satellite and Product Operations Deferred and Extended Maintenance (+$7,500, 0 FTE/ 0 Positions) – NOAA requests an increase to support critical satellite operations and maintenance requirements. These funds will ensure resources to address repairs, maintenance, and major upgrades from a growing backlog. Funding will support maintenance for ground systems and major upgrades to antenna systems at NOAA's Command and Data Acquisition Stations in Wallops Island, Virginia, and Fairbanks, Alaska; and at NOAA's Consolidated Back-up operational facility in Fairmont, West Virginia. Together, these systems command and control NOAA's satellite constellations and provide real-time environmental information and data to the National Weather Service for forecasts and early warnings that save lives and protect property.

Projects will include, but are not limited to, upgrades of antenna motors, feeds, high performance amplifiers, low noise amplifiers, transmitters, drive systems, and control units. NOAA will prioritize the projects in the year of execution based on available funding and mission requirements.

NOAA's satellites collect essential data that serve as a long-term record for monitoring key climate parameters, and there is increasing demand for NOAA's satellite operations to collect more accurate information and expand observing capacity. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022 – FY 2026

- Maintain satellite operation facilities at Suitland, Maryland; Wallops, Virginia; Fairbanks, Alaska; and Fairmont, West Virginia

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(Dollar amounts in thousands)

- Maintain infrastructure for National/Mission High and Moderate Critical IT Systems

Deliverables:

- Maintain satellite operations facilities at Suitland, Maryland; Wallops, Virginia; Fairbanks, Alaska; and Fairmont, West Virginia
- Maintain infrastructure for National/Mission High and Moderate Critical IT Systems

	2022	2023	2024	2025	2026
Percentage of satellite data successfully acquired to meet customer requirements					
With Increase	99%	99%	99%	99%	99%
Without Increase	95%	90%	85%	80%	80%
Outyear Costs:					
Direct Obligations	7,500	7,500	7,500	7,500	7,500
Capitalized	0	0	0	0	0
Uncapitalized	7,500	7,500	7,500	7,500	7,500
Budget Authority	7,500	7,500	7,500	7,500	7,500
Outlays	4,500	4,500	4,500	4,500	4,500
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Environmental Satellite Observing Systems
Subactivity: Office of Satellite and Product Operations (OSPO)

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	32,319	37,714	38,574	38,574	0
11.3	Other than full-time permanent	16	0	0	0	0
11.5	Other personnel compensation	5,657	4,000	4,000	4,000	0
11.7	NOAA Corps	236	277	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	38,228	41,991	42,574	42,574	0
12	Civilian personnel benefits	11,282	12,458	13,858	13,858	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	115	138	138	138	0
22	Transportation of things	87	184	186	186	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	8,416	9,321	9,754	9,754	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	2,940	2,537	2,656	2,656	0
24	Printing and reproduction	33	52	52	52	0
25.1	Advisory and assistance services	35,425	36,800	37,473	37,473	0
25.2	Other services from non-Federal sources	47,557	46,814	47,704	51,204	3,500
25.3	Other goods and services from Federal sources	16,285	33,074	33,678	33,678	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	1,154	1,200	1,221	1,221	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,523	1,242	1,269	2,769	1,500
31	Equipment	2,443	888	930	3,430	2,500
32	Lands and structures	104	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	958	419	419	419	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	3	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	166,553	187,118	191,912	199,412	7,500

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(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Office of Satellite and Product Operations (OSPO)	Pos./BA	291	191,912	291	193,412	0	1,500
	FTE/OBL	285	191,912	285	193,412	0	1,500

Enterprise Infrastructure Solutions (+$1,500, 0 FTE/ 0 Positions) – This increase will enable NOAA to conduct a technology modernization and support an accelerated transition of telecommunications services to the GSA EIS contract vehicle. DOC currently uses GSA's Networx, Washington Interagency Telecommunications System 3, and regional contracts to acquire telecommunication services. These contracts expire in May 2023. Between now and then, DOC will be transitioning telecommunications services to the GSA EIS follow-on contract. Additional EIS requests can also be found in Mission Support (MS-65), NOS (NOS-48, NOS-88, NOS-120, and NOS-149), NMFS (NMFS-71), NWS (NWS-24, NWS-127, and NWS-182), and OMAO (OMAO-19).

NESDIS will prioritize transitioning the remaining NETWORX data circuits that are not part of the NOAA Enterprise WAN (N-Wave). In addition, the increase will support the carrier transition of the NESDIS SARSAT IP operational network of 16 sites to AT&T under EIS. Legacy voice services across NESDIS require upgrades from current Circuit Switched Voice Services.

The modernization enables NOAA to re-architect its network infrastructure to gain efficiencies and resilience, realize significantly reduced costs for network services after transition, and minimize risk as legacy services are discontinued. Increased funding will accelerate the transition and enable NOAA to: (a) contract for engineering services to re-architect the network infrastructure and establish detailed transition plans; (b) issue awards for new hardware and telecommunication services; (c) trench and lay new lines, decommission and provision circuits; and (d) establish funding for administrative services to provide ordering, invoice processing, and inventory management. By expediting the technology modernization and migration to the new EIS vendors, NOAA will realize significant reductions in price and cost-avoidance. This funding will reduce risks related to service delivery and operations due to termination of GSA legacy service contracts.

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(Dollar amounts in thousands)

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
(FY 2022 – FY 2026)

- Award NOAA task orders under EIS to support modernization needs
- Establish a sustainable, resilient architecture to meet NOAA's current and planned needs
- Transition 100% NOAA Legacy GSA inventory to EIS

Deliverables:

- Modernized telecommunications infrastructure capable of meeting the agency's mission
- Provide a centralized ordering and management platform
- Provide a secure infrastructure resistant to extreme weather impacts

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(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Transition of NOAA Telecommunication services to GSA's EIS					
With Increase	35%	60%	80%	100%	0%
Without Increase	20%	45%	55%	65%	75%
Outyear Costs:					
Direct Obligations	1,500	750	0	0	0
Capitalized	0	0	0	0	0
Uncapitalized	1,500	750	0	0	0
Budget Authority	1,500	750	0	0	0
Outlays	900	450	0	0	0
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Environmental Satellite Observing Systems
Subactivity: Office of Satellite and Product Operations (OSPO)

117	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	32,319	37,714	38,574	38,574	0
11.3	Other than full-time permanent	16	0	0	0	0
11.5	Other personnel compensation	5,657	4,000	4,000	4,000	0
11.7	NOAA Corps	236	277	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	38,228	41,991	42,574	42,574	0
12	Civilian personnel benefits	11,282	12,458	13,858	13,858	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	115	138	138	138	0
22	Transportation of things	87	184	186	186	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	8,416	9,321	9,754	9,754	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	2,940	2,537	2,656	4,156	1,500
24	Printing and reproduction	33	52	52	52	0
25.1	Advisory and assistance services	35,425	36,800	37,473	37,473	0
25.2	Other services from non-Federal sources	47,557	46,814	47,704	47,704	0
25.3	Other goods and services from Federal sources	16,285	33,074	33,678	33,678	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	1,154	1,200	1,221	1,221	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,523	1,242	1,269	1,269	0
31	Equipment	2,443	888	930	930	0
32	Lands and structures	104	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	958	419	419	419	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	3	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	166,553	187,118	191,912	193,412	1,500

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National Oceanic and Atmospheric Administration
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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Product Development, Readiness and Application (PDR&A)	Pos./BA	86	29,091	86	37,091	0	8,000
	FTE/OBL	85	29,091	85	37,091	0	8,000

Advance Core Activities (+$8,000, 0 FTE/ 0 Positions) - NOAA requests an increase to improve the development rate of data products, applications, techniques, and systems to return to an appropriate baseline and better meet NOAA mission requirements; to support the transition to operations; to perform user engagement; as well as to support the full requirement for the legacy geostationary and polar satellite systems calibration and validation of instruments. PDR&A conducts required calibration/validation of all data in NOAA's satellite operations as well as partner and commercial satellite data used by NOAA mission services to ensure the sustained accuracy of all satellite products to meet user performance requirements. The number of satellites that NESDIS calibrates and validates has expanded, increasing the requirements for PDR&A and redefining the baseline. For example, while NOAA recently added GOES-16 and 17 and NOAA-20, the legacy satellites of GOES-14 and 15, and NOAA-15/18/19 are still in use. In addition, NOAA needs to maintain GOES-14 and 15 as a critical backup for the GOES-R series. The legacy polar satellites (NOAA-15/18/19) also continue to provide valuable data and products to users including weather forecast models.

Funding will sustain and advance core activities, including critical calibration and validation of products, algorithm development, and product maintenance in order to fully exploit satellite observations and products available to NOAA and advance the products by blending them with other external and international partners to create enterprise products. This increase would also help fully realize partner commitments, such as using data from ESA's MetOp satellites and other non-NOAA satellite data into blended products, in order to maximize the use of NOAA mission products and services, particularly for weather forecasts, including assimilation into numerical weather forecast models, and warnings that protect lives and property.

NOAA's satellites collect essential data that serve as a long-term record for monitoring key climate parameters, and there is increasing demand for NOAA's satellite operations to collect more accurate information and expand observing capacity. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

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Schedule and Milestones:
FY 2022 – FY 2026

- Continue calibration and validation of all NOAA satellite operations
- Sustain development of algorithms and product maintenance
- Incorporate partner mission families into full sustainment posture

Deliverables:

- Maintain NESDIS current product suites
- Fully support calibration and validation of legacy geostationary and polar satellites

Performance Measures	2022	2023	2024	2025	2026
Number of NOAA, partner, and commercial mission families fully supported					
With Increase	16	20	20	20	20
Without Increase	8	8	8	8	8
Outyear Costs:					
Direct Obligations	8,000	8,000	8,000	8,000	8,000
Capitalized	0	0	0	0	0
Uncapitalized	8,000	8,000	8,000	8,000	8,000
Budget Authority	8,000	8,000	8,000	8,000	8,000
Outlays	4,960	4,960	4,960	4,960	4,960
FTE	0	0	0	0	0
Positions	0	0	0	0	0

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Environmental Satellite Observing Systems
Subactivity: Product Development, Readiness and Application (PDR&A)

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	11,821	11,979	12,253	12,253	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	193	196	196	196	0
11.7	NOAA Corps	185	276	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	12,199	12,451	12,449	12,449	0
12	Civilian personnel benefits	4,001	4,252	4,784	4,784	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	131	118	118	338	220
22	Transportation of things	2	4	4	4	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	2,744	2,833	2,966	2,966	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	43	45	47	47	0
24	Printing and reproduction	11	20	21	21	0
25.1	Advisory and assistance services	363	306	314	314	0
25.2	Other services from non-Federal sources	3,055	2,429	2,465	7,085	4,620
25.3	Other goods and services from Federal sources	354	298	306	3,135	2,829
25.4	Operation and maintenance of facilities	0	0	0	106	106
25.5	Research and development contracts	3,521	2,970	3,050	3,050	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	80	20	22	22	0
31	Equipment	204	143	147	147	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	6,687	2,398	2,398	2,623	225
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	33,395	28,287	29,091	37,091	8,000

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Product Development, Readiness and Application (PDR&A)	Pos./BA	86	29,091	86	35,596	0	6,505
	FTE/OBL	85	29,091	85	35,596	0	6,505

Ocean Remote Sensing (+$6,505, 0 FTE/ 0 Positions) – NOAA requests an increase to support sustainment of currently produced ocean products as well as development of additional ocean-related products and their transition to operations, including products utilized by the global and coastal oceans user community, climate-related products, and products and services that support improved understanding of ocean dynamics and marine ecosystems. Ocean Remote Sensing (ORS) products are currently developed and sustained on a best effort basis. These products include sea surface temperature maps that support meteorological weather predictions and commercial and recreational activities (e.g., fishing); ocean color radiometry data, derived chlorophyll-a, and total suspended matter/turbidity products unutilized by biologists to identify runoff plumes and blooms, and also predict harmful algal blooms; and ocean surface vector winds used by sailors and commercial shipping pilots for safe navigation. ORS products are used to find suitable wind farm locations and grow renewable energy; enforce illegal, unreported, and unregulated fishing; monitor oil spills; and build a sustainable aquaculture industry. Increased funding for ORS would provide a dedicated funding source, allowing consistent and continued development, sustainment, and enhancement of products that support NOAA and government-wide initiatives, help build the economy, and strengthen our understanding of the marine environment.

This funding would support ORS products and services provided by NOAA CoastWatch, OceanWatch, and PolarWatch (the Watches), which support all aspects of the Blue Economy as well as monitoring climate change. These Watches provide easy access to a wide range of global and regional satellite environmental data and data products for use in understanding, managing, and protecting ocean and coastal resources, as well as for assessing impacts of environmental change in ecosystems, weather, and climate. In 2020, the Watches provided 156 TB of products to NOAA, public, commercial, academic, and international users. These Watches are also the interface between the users of satellite data products (and related in situ data) and satellite remote sensing science and algorithm development; educate and train users about using satellite data and products; and produce and provide tailored products for core constituent users. Additionally, they provide consistent access to high quality, long term time series data for climate and ecosystem research and applications.

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(Dollar amounts in thousands)

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022 – FY 2026

- Develop ocean-related products and transition products to sustained operations
- Continue to train users in the use of NOAA satellite data and products
- Continue to provide tailored ocean products and services for users

Deliverables:

- Provide at least 20 service enhancements/new ocean products annually
- Hold at least 4 intensive satellite user trainings annually, 1 per quarter

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(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of ocean remote sensing products/service enhancements delivered					
With Increase	20	20	20	20	20
Without Increase	5	5	5	5	5
Number of users trained on satellite data and products					
With Increase	100	100	100	100	100
Without Increase	40	40	40	40	40
Outyear Costs:					
Direct Obligations	6,505	6,505	6,505	6,505	6,505
Capitalized	0	0	0	0	0
Uncapitalized	6,505	6,505	6,505	6,505	6,505
Budget Authority	6,505	6,505	6,505	6,505	6,505
Outlays	4,033	4,033	4,033	4,033	4,033
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Environmental Satellite Observing Systems
Subactivity: Product Development, Readiness and Application (PDR&A)

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	11,821	11,979	12,253	12,253	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	193	196	196	196	0
11.7	NOAA Corps	185	276	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	12,199	12,451	12,449	12,449	0
12	Civilian personnel benefits	4,001	4,252	4,784	4,784	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	131	118	118	143	25
22	Transportation of things	2	4	4	4	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	2,744	2,833	2,966	2,966	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	43	45	47	47	0
24	Printing and reproduction	11	20	21	23	2
25.1	Advisory and assistance services	363	306	314	314	0
25.2	Other services from non-Federal sources	3,055	2,429	2,465	5,928	3,463
25.3	Other goods and services from Federal sources	354	298	306	306	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	3,521	2,970	3,050	3,050	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	80	20	22	37	15
31	Equipment	204	143	147	647	500
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	6,687	2,398	2,398	4,898	2,500
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	33,395	28,287	29,091	35,596	6,505

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Product Development, Readiness and Application (PDR&A)	Pos./BA	86	29,091	89	33,091	3	4,000
	FTE/OBL	85	29,091	87	33,091	2	4,000

Advancing Fire Weather Priorities (+$4,000, 2 FTE/ 3 Positions) - NOAA requests additional funding for fire product research, development, transition, and sustainment. In 2020, wildfires burned over 10 million acres in the U.S. This is approximately 154% of the 10-year average. California and Colorado had their largest wildfires on record in 2020[2]. Fires are increasing in occurrence and spreading more aggressively at a time when the wildland/exo-urban interface is expanding. NESDIS is pursuing a series of short-term and long-term fire product development activities that address critical gaps in the fire product lifecycle. Additional funds will support the transition of new fire product capabilities into operations, support sustained operational production and maintenance, improve the understanding of long-term trends in fire activity, emissions, and land surface properties (e.g. burn scars), and to continuously assess the needs and gaps of fire to best understand how they fit into NOAA and NESDIS goals and objectives for new and existing products and services. In addition, quantifying the contributions of fires to greenhouse gas emissions and the resulting impact on air quality, climate, and the associated linkage requires a multi-year research effort.

NOAA and partner satellites are a critical wildland fire information resource. Geostationary weather satellites, such as those in the GOES-R series, provide near continuous observations. GOES-R Series satellite imagery allows analysts to quickly identify new fires and changes in fire intensity, while providing first-of-a-kind lightning observations. Polar orbiting satellites, such as JPSS, provide high resolution images twice per day. Fire intensity products, derived from JPSS satellites, are a driving factor of operational smoke forecasts from the High Resolution Rapid Refresh (HRRR) model and the Global Forecasting System (GFS). JPSS also provides images that depict fire boundaries and burn scars. The GOES-R Series and JPSS capabilities have exceeded expectations, making new advanced fire applications, including those recommended in key reports, possible. The new fire products and research will address critical gaps but require a long-term investment in order to be sustained. All efforts will be closely coordinated with the fire community and other NOAA line offices (especially OAR and NWS) with an emphasis on being responsive to stakeholder needs,

[2] https://fas.org/sgp/crs/misc/IF10244.pdf

including those of underserved communities, and supporting the proposed NOAA Fire Weather Testbed. Product dissemination shortcomings, uncovered by recent user engagement activities, will also be addressed.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022 – FY 2026

- Demonstrate experimental GOES-R Series fire detection products and alerting system, as well as new event-based fire characterization products in the NOAA Fire Weather Testbed
- Update burnscar database
- Develop Common Data Services project plan for new cloud-based fire product/information system
- Prepare New Fire Detection System (NFDS) with GOES-R Series capabilities for transition into the NESDIS Common Cloud Framework (NCCF)
- Ingest new data sources into the NCCF
- Implement NFDS and updates into the NCCF
- Frame the evolving environment of the user community and compare legacy knowledge to the changing needs which support the roles and responsibilities that brings benefit to society
- Develop and disseminate resources on readiness, responsiveness, and resilience in support of Fire
- Work with partner organizations to integrate NOAA's readiness, responsiveness, and resilience assets
- Work with partners to engage vulnerable populations in becoming ready, responsive, and resilient in response to Fires
- Characterize impacts of new fire products on smoke/emissions forecasting
- Demonstrate product improvements in the NOAA Fire Weather Testbed
- Run NFDS on test cases
- Provide output to the stakeholders for evaluation
- Prepare NFDS with GOES-R Series and JPSS VIIRS capabilities for operational transition into the NCCF, including associated reviews
- Coordinate updates with the stakeholders
- Transition NFDS, including updates, into operations
- Integrate additional satellite sensor data into fire system
- Set up NFDS for reprocessing within the NCCF
- Reprocess the NFDS in the NCCF to update the Climate Data Record

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(Dollar amounts in thousands)

- Generate long-term fire and emission data records from reprocessed fire products

Deliverables:

- Implement 5 fire information system capabilities/enhancements
- Provide annual update on fire activity and emissions
- Provide report on fire system performance and user impacts
- Provide formal and informal education opportunities on resilience, readiness, and responsiveness in support of Fire
- Participate in outreach events on readiness, responsiveness, and resilience in support of Fire
- Implement new fire detection system into the operational environment
- Distribute operational products to users
- Conduct a workshop and disseminate survey to identify user needs and develop a sector scaled understanding of the decision-making needs that impact society
- Provide reprocessed NFDS products to NCEI for archive

Performance Measures	2022	2023	2024	2025	2026
Number of fire information system products/ enhancements delivered					
With Increase	5	5	5	5	5
Without Increase	1-2	1-2	1-2	1-2	1-2
Outyear Costs:					
Direct Obligations	4,000	4,000	4,000	4,000	4,000
Capitalized	0	0	0	0	0
Uncapitalized	4,000	4,000	4,000	4,000	4,000
Budget Authority	4,000	4,000	4,000	4,000	4,000
Outlays	2,480	2,480	2,480	2,480	2,480
FTE	2	3	3	3	3
Positions	3	3	3	3	3

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PROGRAM CHANGE PERSONNEL DETAIL
(Dollar amounts in thousands)

Activity: Environmental Satellite Observing Systems
Subactivity: Product Development, Readiness and Application (PDR&A)

Title		Grade	Number	Annual Salary	Total Salaries
Physical Scientist		ZP-IV	1	128,400	128,400
Physical Scientist		ZP-III/IV	1	116,764	116,764
Physical Scientist		ZP-III	1	90,801	90,801
Total			3		335,965
Less lapse	25.00%		(1)		(83,991)
Total full-time permanent (FTE)			2		251,974
2022 Pay Adjustment (2.7%)					6,803
					258,777

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	2
Total FTE	2
Authorized Positions:	
Full-time permanent	3
Total Positions	3

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Environmental Satellite Observing Systems
Subactivity: Product Development, Readiness and Application (PDR&A)

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	11,821	11,979	12,253	12,512	259
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	193	196	196	196	0
11.7	NOAA Corps	185	276	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	12,199	12,451	12,449	12,708	259
12	Civilian personnel benefits	4,001	4,252	4,784	4,860	76
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	131	118	118	128	10
22	Transportation of things	2	4	4	4	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	2,744	2,833	2,966	2,966	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	43	45	47	47	0
24	Printing and reproduction	11	20	21	22	1
25.1	Advisory and assistance services	363	306	314	314	0
25.2	Other services from non-Federal sources	3,055	2,429	2,465	2,465	0
25.3	Other goods and services from Federal sources	354	298	306	3,959	3,653
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	3,521	2,970	3,050	3,050	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	80	20	22	23	1
31	Equipment	204	143	147	147	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	6,687	2,398	2,398	2,398	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	33,395	28,287	29,091	33,091	4,000

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(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Product Development, Readiness and Application (PDR&A)	Pos./BA	86	29,091	86	31,091	0	2,000
	FTE/OBL	85	29,091	85	31,091	0	2,000

Expanding Arctic and Antarctic Datasets and Products (+$2,000, 0 FTE/ 0 Positions) – NOAA proposes to substantially expand the scope of the current satellite work and its application for the Arctic and Antarctic. Algorithms for existing variables will be improved through a blended, multi-sensor approach; new variables from existing and next-generation observations will be added from NOAA and non-NOAA partner missions; the time series will be extended with new NOAA and partner satellites observations; and the entire satellite data record will be reprocessed for consistency. The result will be more comprehensive datasets that will allow us to study and understand Arctic and Antarctic climate over the period 1982 through the present. Improving the data will substantially expand its use and enable development of new services and climate applications to scientific studies. Additionally, this increase will support products, such as snow depth on ice and sea ice detection, used to facilitate commerce, support national defense, and understand climate change. It will enhance the support that NOAA PolarWatch and other programs (National Ice Center, Alaska Sea Ice Center, Environmental Modeling Center, etc.) can provide to decision-makers and the public. PolarWatch enables data discovery, easy access, and broader usage of high-latitude satellite data products for governmental, academic, commercial, and public users in support of broad applications, including climate, in the Arctic and Southern Oceans.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022 – FY 2026

- Expand polar data discovery and access via PolarWatch
- Target satellite-based sea ice product / service improvements (concentration/motion) that increase capability at operational NOAA centers to evaluate and predict sea ice conditions

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(Dollar amounts in thousands)

- Reprocess the entire satellite data record to extend/create Arctic and Antarctic climate data records

Deliverables:

- Add 5 new/enhanced Arctic and Antarctic products/services to include climate data records and sea ice motion/concentration

Performance Measures	2022	2023	2024	2025	2026
Number of new/enhanced Arctic and Antarctic products and services delivered					
With Increase	5	5	5	5	5
Without Increase	1-2	1-2	1-2	1-2	1-2
Outyear Costs:					
Direct Obligations	2,000	2,000	2,000	2,000	2,000
Capitalized	0	0	0	0	0
Uncapitalized	2,000	2,000	2,000	2,000	2,000
Budget Authority	2,000	2,000	2,000	2,000	2,000
Outlays	1,240	1,240	1,240	1,240	1,240
FTE	0	0	0	0	0
Positions	0	0	0	0	0

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Environmental Satellite Observing Systems
Subactivity: Product Development, Readiness and Application (PDR&A)

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	11,821	11,979	12,253	12,253	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	193	196	196	196	0
11.7	NOAA Corps	185	276	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	12,199	12,451	12,449	12,449	0
12	Civilian personnel benefits	4,001	4,252	4,784	4,784	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	131	118	118	118	0
22	Transportation of things	2	4	4	4	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	2,744	2,833	2,966	2,966	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	43	45	47	47	0
24	Printing and reproduction	11	20	21	21	0
25.1	Advisory and assistance services	363	306	314	314	0
25.2	Other services from non-Federal sources	3,055	2,429	2,465	2,965	500
25.3	Other goods and services from Federal sources	354	298	306	306	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	3,521	2,970	3,050	3,050	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	80	20	22	22	0
31	Equipment	204	143	147	147	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	6,687	2,398	2,398	3,898	1,500
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	33,395	28,287	29,091	31,091	2,000

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(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
U.S. Group on Earth Observations (USGEO)	Pos./BA	0	500	0	1,000	0	500
	FTE/OBL	0	500	0	1,000	0	500

U.S. Group on Earth Observations (USGEO) (+$500, 0 FTE/ 0 Positions) – NOAA requests an increase to the GEO Trust Fund for the operations of the GEO Secretariat and to support the efforts of the AmeriGEO efforts in the Americas. The increased contribution to support the activities of GEO at global and regional levels will accelerate the implementation of the GEO Work Programme, will significantly improve the impact of activities on decision-making for societal benefit and will enable the U.S. to play a stronger leadership role in the GEO organization. This contribution supports a key objective of the USGEO – strengthen global and regional leadership of the United States through engagement in the intergovernmental GEO and advancement of AmeriGEO.

NOAA's satellites collect essential data that serve as a long-term record for monitoring key climate parameters, and there is increasing demand for NOAA's satellite operations to collect more accurate information and expand observing capacity. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022 – FY 2026

- Support the development and growth of the United States' programmatic contributions to the GEO Work Program in support of national and international policy and NOAA mission objectives.
- Increase the U.S. participation in the implementation of GEO's strategic plan through a grant to the GEO Trust Fund.

Deliverables:

- Participation in major GEO meetings and activities to promote international engagement and coordination with stakeholders and outreach.
- GEO Secretariat will devote more resources to strengthen program integration, coordination and user engagement in areas of

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key interest to NOAA such as urban resilience.

- New contractor support to strengthen the capacity of the Inter-American community to advance the application of Earth observations, geospatial, and statistical data through flexible training options to gain required knowledge, skills, and abilities.

Performance Measures	2022	2023	2024	2025	2026
Increase in grant funding in support of the GEO Trust Fund					
With Increase	1	1	1	1	1
Without Increase	0	0	0	0	0
Contract to support the international GEO					
With Increase	1	1	1	1	1
Without Increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	1,000	1,000	1,000	1,000	1,000
Capitalized	0	0	0	0	0
Uncapitalized	1,000	1,000	1,000	1,000	1,000
Budget Authority	1,000	1,000	1,000	1,000	1,000
Outlays	620	620	620	620	620
FTE	0	0	0	0	0
Positions	0	0	0	0	0

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Environmental Satellite Observing Systems
Subactivity: U.S. Group on Earth Observations (USGEO)

Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
Full-time permanent compensation	0	0	0	0	0
Other than full-time permanent	0	0	0	0	0
Other personnel compensation	0	0	0	0	0
NOAA Corps	0	0	0	0	0
Special personnel services payments	0	0	0	0	0
Total personnel compensation	0	0	0	0	0
Civilian personnel benefits	0	0	0	0	0
Benefits for former personnel	0	0	0	0	0
Travel and transportation of persons	5	0	0	0	0
Transportation of things	0	0	0	0	0
Rental payments to GSA	0	0	0	0	0
Rental Payments to others	0	0	0	0	0
Communications, utilities and misc charges	0	0	0	0	0
Printing and reproduction	0	0	0	0	0
Advisory and assistance services	0	0	0	0	0
Other services from non-Federal sources	0	0	0	0	0
Other goods and services from Federal sources	16	0	0	0	0
Operation and maintenance of facilities	0	0	0	0	0
Research and development contracts	0	0	0	0	0
Medical care	0	0	0	0	0
Operation and maintenance of equipment	0	0	0	0	0
Subsistence and support of persons	0	0	0	0	0
Supplies and materials	0	0	0	0	0
Equipment	0	0	0	0	0
Lands and structures	0	0	0	0	0
Investments and loans	0	0	0	0	0
Grants, subsidies and contributions	489	500	500	1,000	500
Insurance claims and indemnities	0	0	0	0	0
Interest and dividends	0	0	0	0	0
Refunds	0	0	0	0	0
Total obligations	510	500	500	1,000	500

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JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: National Centers for Environmental Information

Goal Statement

NOAA's National Centers for Environmental Information (NCEI) is the Nation's leading authority for environmental information and is responsible for preserving, hosting, and providing access to one of the most significant environmental archives on Earth, with comprehensive oceanic, atmospheric, and geophysical data and information, covering the depths of the ocean to the surface of the sun, and from million-year-old sediment records to near real-time satellite images.

Base Program

The amount and demand for high-value environmental data and information has dramatically increased in recent years. NCEI currently hosts and provides access to over 40 petabytes (PB) (40,000 TB or 40 million GB) of data (primary and secure copy) and anticipates that the demand for data stewardship will rise to over 400 PB by 2030. Additionally, NCEI directly assists data users, servicing over 13,000 individual contacts annually, by email, phone, mail, and online. NCEI also provides key, easily-understood environmental data information via the NCEI website, with 14 million website visitors yearly.

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JUSTIFICATION OF PROGRAM AND PERFORMANCE
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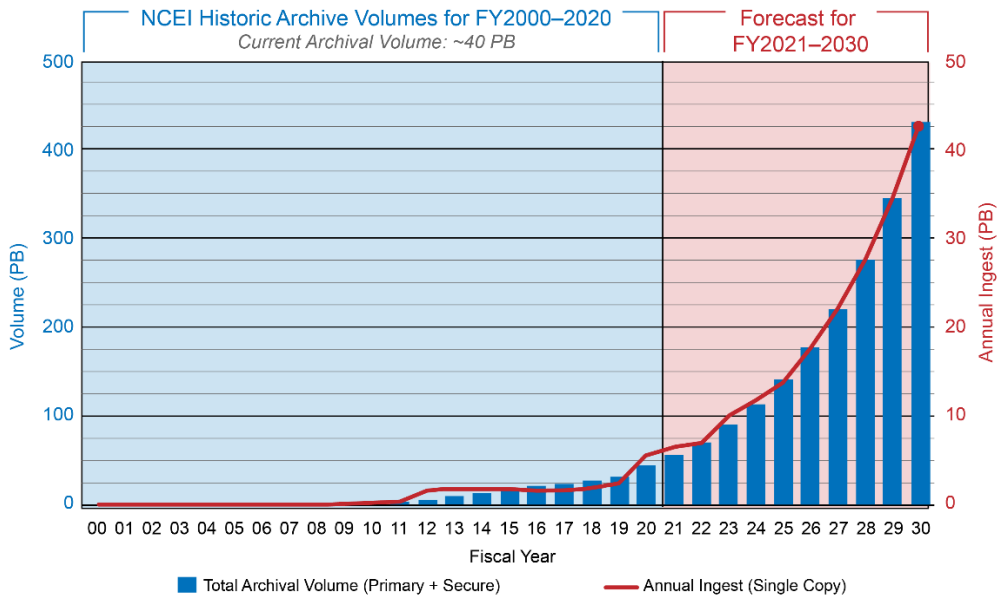

NCEI houses over 40 PB of data from ground, ocean, and space-based observation platforms that measure from the bottom of the ocean to the surface of the sun. The data holdings start with the present and go back millennia, and also include forward-looking model output. NCEI is the official archive of NOAA's GOES, POES, JPSS, GOES-R Series, Jason, and COSMIC-2 satellite data. Housing data covering from the 1970s to the present, over 2.3 PB are delivered to the archive annually from active satellites. With improvements in observation platforms, data stored at NCEI is expected to increase exponentially in the next decade. NCEI works with NOAA offices to host data from programs, including OAR's Office of Ocean Exploration and Research, NWS's Tsunami Program, NOS's Office of Coast Survey and National Geodetic Survey, NMFS's Office of Science and Technology, and OMAO ships and aircraft. NCEI also provides a repository for other national and international data collectors. NCEI develops critical climate services that are used every day by the NWS and provides a significant portion of NOAA's public-facing climate services mission.

Beyond NOAA, NCEI utilizes its expertise, datasets, and nation-wide presence to support State and Federal agencies, international partners, and industry. This includes programs with the Department of Defense, Department of Homeland Security's Federal

Emergency Management Agency, Department of Agriculture, Department of Transportation's Federal Aviation Administration, and Department of State, as well as supporting every sector of the American economy.

There are significant variations in information collected and needed across the U.S. NCEI has built a nationwide presence to best support priorities and needs at the national, regional, local and international levels. NCEI is headquartered in Asheville, North Carolina, with significant presences in Boulder, Colorado; Stennis Space Center, Mississippi; and Silver Spring, Maryland. NCEI further supports regional outreach through Regional Climate Service Directors strategically located in Taunton, Massachusetts; Kansas City, Missouri; and Honolulu, Hawaii, with additional staff located in South Carolina and Wisconsin. NCEI also hosts four World Data Centers, as part of the International Science Council, providing international leadership in environmental data management.

NCEI's work directly supports EO 14008, Tackling the Climate Crisis at Home and Abroad, and EO 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis, by providing access to PBs of environmental data, assessing the climate on a monthly basis, supporting regional climate work, analyzing national and global climate information in monthly and annual climate reports, and working directly with the public to assist in discovering and understanding data and information needs to inform decision making. The timely and accurate information provided by NCEI helps local and state governments, regions, and national and international decision makers prepare for and build back better from natural disasters and climate-related hazards; enables communities and industries to make climate smart decisions about the future; and helps ensure the longevity, sustainability, and prosperity of our natural resources, as well as the people, communities, and economies that rely on those resources.

See the Program Change for the proposed schedule, milestones, deliverables, performance goals and measurement data, and the budget profile.

Statement of Operating Objectives

National Centers for Environmental Information (NCEI)
Schedule and Milestones:
FY 2022 – FY 2026

- Archive a minimum of 83 percent of all ingested data, including the U.S. Climate Reference Network data, ocean observations from NOAA vessels, and space weather data from NOAA geostationary satellites
- Provide access to environmental data and products for use in ecosystem baselines, monitoring, and assessments including Large Marine Ecosystem data
- Collect, review, and adjudicate user community needs across as many U.S. sectors as possible to identify the highest priority,

core needs for improving existing products and informing new product development at a reduced rate with this reduction

Deliverables:

FY 2022 – FY 2026

- Provide archive and access services for NOAA and NOAA partners' environmental data and their derived products from *in situ* and satellite observations, including from geostationary, polar-orbiting, and space weather platforms
- Continue to archive and provide access to Large Marine Ecosystem data
- Provide an annual analysis of user engagement at the national level.

Explanation and Justification

Comparison by Subactivity		2020 Actuals Personnel	2020 Actuals Amount	2021 Enacted Personnel	2021 Enacted Amount	2022 Base Program Personnel	2022 Base Program Amount
National Centers for Environmental Information (NCEI)	Pos/BA	167	60,963	186	63,040	186	65,126
	FTE/OBL	152	62,594	172	63,040	172	65,126
Total National Centers for Environmental Information (NCEI)	Pos/BA	167	60,963	186	63,040	186	65,126
	FTE/OBL	152	62,594	172	63,040	172	65,126

National Centers for Environmental Information (NCEI) (https://www.ncei.noaa.gov/): NCEI is continually working to foster innovative and value-added strategies, including the development of newly integrated products and services that span the science disciplines and enable better data discovery. By preserving, stewarding, and maximizing the utility of the Federal government's multi-billion-dollar investment in high-quality environmental data, NCEI remains committed to providing products and services to private industry and businesses, local and international governments, academia, and the general public. NCEI:

- Provides billions of dollars of benefit to the US economy through authoritative and actionable environmental data that informs future investments across sectors such as finance, agriculture, fisheries, transportation, energy, insurance, and manufacturing;
- Transforms complex, long-term data from a variety of legacy and modern observing systems into use-inspired, operational products and information to meet the needs of government, academia, and U.S. industry;

- Provides data preservation and access services that enable full use of the Nation's multi-billion dollar investment in satellite, ship, aircraft, and *in situ* observations;
- Advances and enables environmental science and decision making for resilient ocean and coastal communities, the Arctic, and space weather through derived products, assessments, and information services in support of customer requirements;
- Provides authoritative U.S. and global retrospective weather and climate data and information for decision making through use-inspired applied science, products, services, and assessments and monitoring;
- Maintains the Nation's archive of environmental information as well as international data holdings through the World Data System and leverages data portals and cloud services to maximize the availability and accessibility of official archived records;
- Conducts integrated scientific analyses of coastal and marine environmental datasets to better understand historical trends, anomalies, and the frequency of event occurrences; and,
- Provides regional and sectoral climate services in coordination with other NOAA and federal entities to ensure that broad national comprehensive data and information, products, and services are available to public and private sector users at the local, state, regional, and federal levels.

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		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
National Centers for Environmental Information (NCEI)	Pos./BA	186	65,126	186	71,426	0	6,300
	FTE/OBL	172	65,126	172	71,426	0	6,300

Improving Local, State, and Regional Climate Services (+$6,300, 0 FTE/ 0 Positions) - NOAA requests an increase to support local, state, and regional climate services and fund climate change attribution services. NCEI's Regional Climate Services (RCS), including the Regional Climate Centers (RCC), support the development and delivery of a wide range of place-based climate science and information products and services to help people make informed decisions. These efforts increase the value of climate information to users and support more efficient, cost-effective delivery of products and services relevant to region-specific economic activity, hazards, and vulnerability. Expanding RCS, including investing in software, design, and staffing for data entry and analysis to support NOAA's research, observation, and modeling science, would enable NOAA to better articulate user needs for prioritization, improve development and delivery of operational regional information, and support engagement experts to showcase user needs by sector, geography, and timescale. Funding to improve RCS would also allow NOAA to hire and sustain additional RCS Directors who play a primary role in communicating with stakeholders, building and strengthening partnerships, and integrating NOAA's work with others engaged in developing and delivering climate services at the regional level. It would allow the level of support necessary to systematically identify needs and NOAA's role in supporting the top economic sectors, which vary from region to region.

NOAA proposes to re-invigorate the State Climate partnership, and to train the local forecast office focal points on NOAA's climate assets available at local scales. This funding would support RCCs to build and refine NOAA's national products to meet the specific needs at state and local scales. Regional and state partners are also uniquely positioned to help identify and amplify the climate services needs of traditionally underserved communities and populations.

Additionally, the increased number and severity of disasters such as record wildfires, drought, heatwaves, and flooding events in recent years has resulted in frequent requests to connect these disasters to climate change. With increased funding, the science of attribution would become an operational climate service, leveraging NCEI's monitoring and assessment roles. Support for this work would build on cloud and artificial intelligence infrastructure, and would operationalize a multi-million dollar research-to-operations effort that includes OAR, NESDIS, and NWS.

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Research is a core capability of NOAA. This request will help NOAA meet the Administration's climate research goals, including EO 14008, and is critical to ensuring NOAA produces research data, tools, and information products that are publically accessible to facilitate climate change decision-making Nation-wide.

Schedule and Milestones:
FY 2022 – FY 2026

- Work with state climatologists to ensure regional products are better integrated into state government decisions.
- Work through NOAA Line Office Climate Services units and the NOAA Regional Collaboration teams to familiarize field personnel with NOAA climate assets. Coordinate on training enhancements when appropriate.
- Establish an operational event attribution function, including reporting mechanisms and cadence.

Deliverables:

- Create a unified mechanism for the collection of end-user engagement needs and lessons learned, which will allow for leadership discussion and adjudication
- Fill all vacant Regional Climate Services Director positions
- Report operationally on extreme events beginning FY 2023, leveraging NCEI's monthly and quarterly climate monitoring schedule, and increase the number of events addressed over the five-year window.
- Identify and document research needs/science gaps, and share with NOAA science partners, including OAR and NWS.

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Performance Measures	2022	2023	2024	2025	2026
Number of economic sectors regionally engaged, with sectoral needs documented and prioritized					
With Increase					
Economic sectors per region	Top 5	Top 6	Top 8	Top 10	Top 12
Total	30	36	48	60	72
Without Increase	9	9	9	9	9
Number of extreme events operationally analyzed and reported					
With Increase	0	1	1	2	4
Without Increase	0	0	0	0	0

	2022	2023	2024	2025	2026
Outyear Costs:					
Direct Obligations	6,300	6,300	6,300	6,300	6,300
Capitalized	0	0	0	0	0
Uncapitalized	6,300	6,300	6,300	6,300	6,300
Budget Authority	6,300	6,300	6,300	6,300	6,300
Outlays	3,906	3,906	3,906	3,906	3,906
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Activity: National Centers for Environmental Information
Subactivity: National Centers for Environmental Information (NCEI)

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	18,551	19,614	20,044	20,044	0
11.3	Other than full-time permanent	275	290	290	290	0
11.5	Other personnel compensation	271	285	285	285	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	19,097	20,189	20,619	20,619	0
12	Civilian personnel benefits	6,509	7,152	7,960	7,960	0
13	Benefits for former personnel	2	20	20	20	0
21	Travel and transportation of persons	293	152	152	168	16
22	Transportation of things	15	10	10	10	0
23	Rent, communications, and utilitites	0	0	0	53	53
23.1	Rental payments to GSA	4,753	4,732	5,014	5,014	0
23.2	Rental Payments to others	534	532	532	532	0
23.3	Communications, utilities and misc charges	530	528	528	528	0
24	Printing and reproduction	29	29	29	30	1
25.1	Advisory and assistance services	16,162	17,572	18,122	18,122	0
25.2	Other services from non-Federal sources	8,285	9,243	9,243	15,472	6,229
25.3	Other goods and services from Federal sources	771	859	859	859	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	7	8	8	8	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	646	169	180	181	1
31	Equipment	313	244	249	249	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	4,648	1,601	1,601	1,601	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	62,594	63,040	65,126	71,426	6,300

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
National Centers for Environmental Information (NCEI)	Pos./BA	186	65,126	186	70,426	0	5,300
	FTE/OBL	172	65,126	172	70,426	0	5,300

Enhance Enterprise Data Stewardship and Archiving (+$5,300, 0 FTE/ 0 Positions) - NOAA requests an increase to enhance enterprise data stewardship and archiving to further enhance the value of NOAA's investment in Earth observations. Currently NCEI processes about 25 requests for recurring data and over 170 single submissions each year.[3] These stewardship services ensure data providers have their data preserved and accessible in accordance with regulations and best practices as well enable users, such as climate researchers, state and local resource managers, and infrastructure planners, to fully leverage these data to inform decision making and create economic value for the nation. This increase will allow for improvements to NCEI's data stewardship by increasing the capacity to complete at least 50 continuous data set requests per year to address the over 130 pending requests by partners for continuous stewardship services and supporting sustainment of existing systems as cloud solutions are developed. It will allow NCEI to address the current demand for data management, archive, and access capabilities and be able to better meet future demand. The priority will be on ensuring climate and coastal data are stewarded to support agency priorities.

NCEI's data stewardship and archiving services supports the broad NOAA mission from the surface of the sun to the bottom of the ocean and ensures equitable discoverability, access, and usability of NOAA environmental data in alignment with the Federal Data Strategy and Federal Evidence-Based Policymaking Act. These efforts ensure the highest return on investment of NOAA's Earth observations by ensuring data are findable, accessible, interoperable, and reusable (FAIR), supporting scientific discovery today and decades into the future. In addition, FAIR data practices promote data equality by being broadly available and independently understandable, expanding the usability to nontraditional users such as minority serving institutions and underserved communities.

[3] Recurring (continuous) data submissions are collections of related data that are archived at some frequency, such as daily, monthly, or yearly. An example of a continuous data submission is for satellite or radar data that is delivered hourly or daily. A single submission is a one time submission of data to the archive. An example of a single data submission is ocean data from a cruise that is delivered once after the ship returns to port and data are processed.

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(Dollar amounts in thousands)

NCEI works in partnership across NESDIS, NOAA, other Federal agencies, and international partners to engage stakeholders and leverage subject matter expertise to meet this mission.

Advances in observation, processing, and visualization technology have increased the demand for data stewardship and archiving services to manage increasingly large, complex, and variable data as well as provide trusted, curated, interoperable, and timely data. NCEI has struggled to keep pace with the demand which is expected to continue to grow exponentially. Expanding data stewardship and archiving capability will allow NCEI to address current NOAA demands for services and be prepared to leverage technology to further increase capacity. This investment will provide the foundational, trusted data for integrated climate, health, and economic research as well as create jobs through contract support.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022 – FY 2026

- Establish data archive teams and reduce the environmental data archive backlog based on current demand
- Partner across NOAA to improve data stewardship planning and create joint annual archive plan
- Maintain and sustain legacy enterprise stewardship capabilities

Deliverables:

- Create cross-NOAA annual archive plan
- Reduce the current pending archive requests by stewarding an additional 25 continuous data sets annually

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of continuous data sets archived annually					
With Increase	50	50	50	50	50
Without Increase	25	25	25	25	25
Outyear Costs:					
Direct Obligations	5,300	5,300	5,300	5,300	5,300
Capitalized	0	0	0	0	0
Uncapitalized	5,300	5,300	5,300	5,300	5,300
Budget Authority	5,300	5,300	5,300	5,300	5,300
Outlays	3,286	3,286	3,286	3,286	3,286
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: National Centers for Environmental Information
Subactivity: National Centers for Environmental Information (NCEI)

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	18,551	19,614	20,044	20,044	0
11.3	Other than full-time permanent	275	290	290	290	0
11.5	Other personnel compensation	271	285	285	285	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	19,097	20,189	20,619	20,619	0
12	Civilian personnel benefits	6,509	7,152	7,960	7,960	0
13	Benefits for former personnel	2	20	20	20	0
21	Travel and transportation of persons	293	152	152	152	0
22	Transportation of things	15	10	10	10	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	4,753	4,732	5,014	5,014	0
23.2	Rental Payments to others	534	532	532	532	0
23.3	Communications, utilities and misc charges	530	528	528	528	0
24	Printing and reproduction	29	29	29	29	0
25.1	Advisory and assistance services	16,162	17,572	18,122	18,122	0
25.2	Other services from non-Federal sources	8,285	9,243	9,243	14,543	5,300
25.3	Other goods and services from Federal sources	771	859	859	859	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	7	8	8	8	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	646	169	180	180	0
31	Equipment	313	244	249	249	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	4,648	1,601	1,601	1,601	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	62,594	63,040	65,126	70,426	5,300

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
National Centers for Environmental Information (NCEI)	Pos./BA	186	65,126	186	71,126	0	6,000
	FTE/OBL	172	65,126	172	71,126	0	6,000

Climate Data Records (+$6,000, 0 FTE/ 0 Positions) - Additional funding is requested to revitalize NOAA's ability to develop and operationally sustain seamless and consistent multi-decadal climate data records (CDRs) derived from NOAA and partner satellite observations. Government, industry, and academia use CDRs to detect, monitor, and assess climate change-related trends and patterns in the Earth system. CDRs also support various climate adaptation and risk-assessment applications, and help to put recent or ongoing events into the historical context that helps gauge their significance. Without additional funding, the ability of NOAA to meet its mission to the energy, transportation, and food security industries will begin to degrade as older instruments fail and newer data are not incorporated into the record. Most CDRs address the Essential Climate Variable (ECV) requirements of the Global Climate Observing System (GCOS), and support global modeling efforts and national and international assessments (e.g., Intergovernmental Panel on Climate Change, IPCC). Other CDRs deal with even more foundational data, allowing for comparison of fundamental satellite output. This historically-consistent base data fuels the development of products, services, and science that can foster a greater understanding of the earth system and inform development of future observing platforms.

Additional funding would allow NOAA to 1) augment its capability to develop use-driven CDRs addressing the nation's most pressing societal challenges, such as climate extremes (floods, droughts, heat waves, hurricanes, space weather), and international commitments such as the recurring Global Stocktakes of the Paris Agreement's mitigation and adaptation progress; 2) migrate and upgrade existing CDRs to utilize NOAA's advanced satellite fleet (JPSS, GOES-R Series) rather than end-of-life legacy satellites (POES, GOES, DMSP); 3) maintain and operationally sustain the CDRs using new observations as acquired, including episodically reprocessing full periods-of-record (1970s to present) as needed for improvements and consistency; and 4) develop and deliver CDR-relevant services -- including training and education -- to the U.S. public. NOAA will continue to coordinate its efforts with traditional U.S. partners (NASA, USGS) and international partners (e.g., EUMETSAT, ESA/Copernicus) to maximize value to the taxpayer.

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(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022 – FY 2026

- Continue preservation of existing climate data records and generation of new records
- Incorporate next-generation satellite missions into existing or new climate data records
- Incorporate new CDRs into accessible and understandable public products
- Engage with public and partner stakeholder groups to facilitate uptake of CDRs and their utility to assess climate change

Deliverables:

- Development or updating of two new climate data records per year, including atmospheric and ocean carbon

Department of Commerce
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Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of climate data records created or updated					
With Increase	26	28	30	32	34
Without Increase	26	22	15	11	11
Incorporation of next-generation missions into climate data records					
With Increase	1	1	1	2	2
Without Increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	6,000	6,000	6,000	6,000	6,000
Capitalized	0	0	0	0	0
Uncapitalized	6,000	6,000	6,000	6,000	6,000
Budget Authority	6,000	6,000	6,000	6,000	6,000
Outlays	3,720	3,720	3,720	3,720	3,720
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: National Centers for Environmental Information
Subactivity: National Centers for Environmental Information (NCEI)

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	18,551	19,614	20,044	20,044	0
11.3	Other than full-time permanent	275	290	290	290	0
11.5	Other personnel compensation	271	285	285	285	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	19,097	20,189	20,619	20,619	0
12	Civilian personnel benefits	6,509	7,152	7,960	7,960	0
13	Benefits for former personnel	2	20	20	20	0
21	Travel and transportation of persons	293	152	152	167	15
22	Transportation of things	15	10	10	10	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	4,753	4,732	5,014	5,014	0
23.2	Rental Payments to others	534	532	532	532	0
23.3	Communications, utilities and misc charges	530	528	528	528	0
24	Printing and reproduction	29	29	29	30	1
25.1	Advisory and assistance services	16,162	17,572	18,122	18,122	0
25.2	Other services from non-Federal sources	8,285	9,243	9,243	15,226	5,983
25.3	Other goods and services from Federal sources	771	859	859	859	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	7	8	8	8	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	646	169	180	181	1
31	Equipment	313	244	249	249	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	4,648	1,601	1,601	1,601	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	62,594	63,040	65,126	71,126	6,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amount in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
National Centers for Environmental Information (NCEI)	Pos./BA	186	65,126	186	70,026	0	4,900
	FTE/OBL	172	65,126	172	70,026	0	4,900

Sustainment of Cloud Framework for Environmental Data (+$4,900, 0 FTE/ 0 Positions) - NOAA requests additional funding to provide sustained science and data stewardship operations in the cloud. To enable accelerated public access, increased data innovation, and economic exploitation of NCEI products and services, NESDIS proposes to move all of its product areas and supporting applications to the cloud. While NESDIS' Data-source Agnostic Common Services (DACS) Program will cover the initial transition of NESDIS data to the cloud (see NESDIS-147 for more information), NCEI will use this request to continue to grow operational stewardship and science services as well as enhance consumer services for the public in the cloud. Initial focus will be on software and metadata development, optimization, and consolidation to handle higher data volumes and complexities, prepare for launching to the cloud, and facilitate data-driven decision-making by enabling tools, applications, and visualizations. Longer-term, the focus will be on sustaining and enhancing operational science services for customers, such as a program for providing climate products. Under NOAA's Big Data Program, NESDIS demonstrated the value of moving its products to the cloud when it showed that access to its Next Generation Weather Radar (NEXRAD) archive from the cloud increased by over 130%. That increased access directly led to increased economic benefit when the Climate Corporation ("Climate"), a division of the Monsanto Company, used this data to generate products for agricultural industries, reducing product development timelines and total cost[4]

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:

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[4] Ansari, S., Greco, S., Kearns, E., Brown, O., Wilkins, S., Ramamurthy, M., Weber, J., May, R., Sundwall, J., Layton, J., Gold, A., Pasch, A., and Lakshmanan, V. 2018: Unlocking the Potential of NEXRAD Data Through NOAA's Big Data Partnership. *Bulletin of the American Meteorological Society*. 99:1, 189-204. Available: https://journals.ametsoc.org/view/journals/bams/99/1/bams-d-16-0021.1.xml

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PROGRAM INCREASE FOR 2022
(Dollar amount in thousands)

FY 2022 – FY 2026

- Continue preparation of environmental data for transition to the cloud
- Increase use of cloud-based tools, applications, and visualizations to support data-driven decision making.

Deliverables:

- Optimize most used datasets in the cloud for interoperability and AI/ML use.
- Sustain operational stewardship and science services in the Cloud

Performance Measures	2022	2023	2024	2025	2026
Percentage of product areas sustained in the Cloud					
With Increase	15%	35%	60%	85%	100%
Without Increase	0%	0%	0%	0%	0%
Outyear Costs:					
Direct Obligations	4,900	4,900	4,900	4,900	4,900
Capitalized	0	0	0	0	0
Uncapitalized	4,900	4,900	4,900	4,900	4,900
Budget Authority	4,900	4,900	4,900	4,900	4,900
Outlays	3,038	3,038	3,038	3,038	3,038
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: National Centers for Environmental Information
Subactivity: National Centers for Environmental Information (NCEI)

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	18,551	19,614	20,044	20,044	0
11.3	Other than full-time permanent	275	290	290	290	0
11.5	Other personnel compensation	271	285	285	285	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	19,097	20,189	20,619	20,619	0
12	Civilian personnel benefits	6,509	7,152	7,960	7,960	0
13	Benefits for former personnel	2	20	20	20	0
21	Travel and transportation of persons	293	152	152	152	0
22	Transportation of things	15	10	10	10	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	4,753	4,732	5,014	5,014	0
23.2	Rental Payments to others	534	532	532	532	0
23.3	Communications, utilities and misc charges	530	528	528	528	0
24	Printing and reproduction	29	29	29	29	0
25.1	Advisory and assistance services	16,162	17,572	18,122	18,122	0
25.2	Other services from non-Federal sources	8,285	9,243	9,243	14,143	4,900
25.3	Other goods and services from Federal sources	771	859	859	859	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	7	8	8	8	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	646	169	180	180	0
31	Equipment	313	244	249	249	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	4,648	1,601	1,601	1,601	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	62,594	63,040	65,126	70,026	4,900

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Systems Acquisition

Goal Statement

NOAA's satellite portfolio provides the backbone for the operational data products that support NOAA's work related to weather, climate, oceans, coasts, and ecosystems. NOAA satellite data drives critical decision-making, impacts national security, and numerous sectors of the economy including agriculture, transportation, energy, construction, infrastructure, emergency management, and hazard mitigation.

Base Program

NOAA maintains three portfolios of environmental satellites and data acquisition that produce crucial sets of observations: low-earth orbiting, geostationary, and space weather. In FY 2022, Systems Acquisition includes flight, ground, and architecture planning, risk reduction, and development activities, spread across five Subactivities: LEO, GEO, SWO, SAE, and CGS. The FY 2022 request enables NOAA satellite programs to continue to meet milestones, as well as to plan for future programs and comprehensive engineering solutions. Detailed operating objectives for each Subactivity are described below.

Statement of Operating Objectives

Geostationary Earth Orbit (GEO): See the Program Changes for the proposed schedule, milestones, deliverables, performance goals and measurement data, and the budget profile.

Low Earth Orbit (LEO): See the Program Changes for the proposed schedule, milestones, deliverables, performance goals and measurement data, and the budget profile.

Space Weather Observations (SWO): See the Program Changes for the proposed schedule, milestones, deliverables, performance goals and measurement data, and the budget profile.

Common Ground Services (CGS): See the Program Change for the proposed schedule, milestones, deliverables, performance goals and measurement data, and the budget profile.

Systems/Services Architecture & Engineering (SAE): See the Program Changes for the proposed schedule, milestones, deliverables, performance goals and measurement data, and the budget profile.

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JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Explanation and Justification

Comparison by Subactivity		2020 Actuals Personnel	2020 Actuals Amount	2021 Enacted Personnel	2021 Enacted Amount	2022 Base Program Personnel	2022 Base Program Amount
Geostationary Earth Orbit (GEO)	Pos/BA	0	0	0	10,000	47	344,500
	FTE/OBL	0	0	0	10,000	47	344,500
Geostationary Systems - R (GOES-R)	Pos/BA	56	302,575	47	334,500	0	0
	FTE/OBL	44	302,248	47	334,500	0	0
Low Earth Orbit (LEO)	Pos/BA	0	0	0	0	95	678,127
	FTE/OBL	0	0	0	0	93	678,127
Polar Weather Satellites (PWS)	Pos/BA	106	734,500	89	657,835	0	0
	FTE/OBL	88	736,484	88	657,835	0	0
Cooperative Data and Rescue Services (CDARS)	Pos/BA	4	11,323	4	14,400	0	0
	FTE/OBL	3	14,595	3	14,400	0	0
COSMIC 2/GNSS RO	Pos/BA	2	5,876	2	5,892	0	0
	FTE/OBL	2	6,813	2	5,892	0	0
Space Weather Observations (SWO)	Pos/BA	0	0	0	0	30	114,721
	FTE/OBL	0	0	0	0	28	114,721
Projects, Planning, and Analysis (PPA)	Pos/BA	20	30,828	15	15,945	0	0
	FTE/OBL	17	33,710	15	15,945	0	0
Space Weather Follow On (SWFO)	Pos/BA	8	63,928	15	108,115	0	0
	FTE/OBL	9	63,601	13	108,115	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Comparison by Subactivity		2020 Actuals Personnel	2020 Actuals Amount	2021 Enacted Personnel	2021 Enacted Amount	2022 Base Program Personnel	2022 Base Program Amount
Common Ground Services (CGS)	Pos/BA	37	54,103	35	39,287	35	48,626
	FTE/OBL	39	52,608	34	39,287	34	48,626
Systems/Services Architecture & Engineering (SAE)	Pos/BA	13	33,506	29	38,500	29	38,500
	FTE/OBL	18	29,160	27	38,500	27	38,500
Total NESDIS Systems Acquisition	Pos/BA	246	1,236,639	236	1,224,474	236	1,224,474
	FTE/OBL	220	1,239,219	229	1,224,474	229	1,224,474

Geostationary Earth Orbit (GEO): GEO observations and measurements, provided by NOAA assets, partner assets, or commercially procured, contribute to weather forecast models and drive short-term weather forecasts and severe weather warnings. GEO data also provides advanced detection and monitoring of environmental hazards like wildfires, smoke, dust, volcanic ash, drought, and flooding. GEO comprises services and data products from specific missions, as well as from enterprise products and services that are source-agnostic. This subactivity also includes ground system development and sustainment for GEO and for future geostationary Earth observations. GEO will manage current and future geostationary observations as a portfolio, while maintaining transparency into the development schedule, and the annual and life cycle costs for all individual programs and projects comprising the observing system elements.

The GEO Subactivity is divided into two Line Items:

- **Geostationary Systems – R (GOES-R) (http://www.goes-r.gov):** GOES-R provides NOAA's latest generation of Geostationary Operational Environmental Satellites (GOES). The GOES-R Series, a four satellite program, provides advanced imagery and atmospheric measurements of Earth's weather, climate, oceans and environment, real-time mapping of lightning activity, and improved monitoring of solar activity and space weather. Observations from these satellites provide coverage of the western hemisphere from a geostationary orbit, allowing continuous monitoring of severe storms, tropical cyclones, volcanic eruptions, fire hot spots, cloud and atmospheric moisture changes, long term climate trends, lightning, currents flow dynamics, and atmospheric smoke and dust. Observations from GOES-R Series space weather instruments enable NOAA's Space Weather Prediction Center to significantly improve space weather forecasts and provide early warning of possible impacts to the Earth's space environment and potentially disruptive events on the ground. The system delivers critical real-time data and information needed for sound decision making, addresses needs to support expanded climate services, and works with global partners.

  The GOES program, which has provided essential observational data since 1975, supports NOAA's NWS in forecasting, tracking, and monitoring severe storms. The GOES-R Series satellites provide significant enhancements for all operational users of geostationary observations, in particular NWS. For example, calculating the probability that a developing storm will produce severe weather within the next hour is improved in the GOES-R Series era, given the additional information from the Advanced Baseline Imager (ABI) and total lightning data from the Geostationary Lightning Mapper (GLM). The products resulting from this data will improve as a result of more frequent images, a factor of four improvement in spatial resolution, more spectral bands for inferring cloud properties, and lightning mapping. The increased quantity, quality, and accuracy of satellite data that the GOES-R Series produces will enable NWS to issue improved and timelier weather watches, warnings, and advisories to the public, protecting life and property.

The GOES-R Series provides data that enhances a number of NOAA products and services, including:

- Cloud images and precipitation estimates for hurricanes and other coastal storms;
- Images of the U.S. and adjacent ocean areas to enable the detection, tracking, and intensity changes of hurricanes and other major climate and weather events; and,
- Improved numerical weather prediction models and flood/drought assessments.

The first satellite in the series, GOES-R, launched on November 19, 2016, and became GOES-16 when it reached geostationary orbit. GOES-16 replaced GOES-13 as NOAA's operational GOES East satellite on December 18, 2017. The GOES-R Series launched the second satellite on March 1, 2018. GOES-S became GOES-17 when it reached geostationary orbit. GOES-17 became operational as GOES West on February 12, 2019. GOES-T is scheduled to launch in December 2021, followed by GOES-U in 2024.

- **Geostationary Extended Observations (GeoXO) (https://www.nesdis.noaa.gov/GeoXO):**

To more appropriately describe the mission and observations funded within NOAA's next-generation geostationary satellite program, NOAA renamed the mission to Geostationary Extended Observations (GeoXO) from Geostationary and Extended Orbits (GEO-XO). Funding for observations from extended orbits, such as Lagrange-1, is included within the SWO PPA.

NOAA's Geostationary Extended Observations (GeoXO) satellite program is the ground-breaking mission that will advance Earth observations from geostationary orbit. GeoXO will supply vital information to address major environmental challenges of the future in support of U.S. weather, ocean, and climate operations. NOAA is working to ensure these critical observations are in place by the early 2030s as the GOES-R Series nears the end of its operational lifetime. By 2033, GOES-16 and GOES-17 will have reached the end of their design lives and NOAA will no longer be able to provide an on-orbit spare geostationary satellite, putting continuity of real time imagery at risk. Any break in the continuous stream of real-time data would pose an enormous risk to millions of lives and billions of dollars in activity that ensure our national and economic security.

The GeoXO program will move into the formulation phase in FY 2022. During the formulation phase, GeoXO will establish the final definition of the overall GeoXO program scope and architecture based on impact analysis and cost/benefit assessments. NOAA will integrate community and industry input into potential options, inform development activities for future systems, and confirm the viability of commercial hosting architectures.

GeoXO satellites will likely host space weather instruments and its ground system will provide services for NOAA's deep space weather satellites. Space weather requirements are funded by the SWO PPA.

Low Earth Orbit (LEO): Low Earth and future medium Earth observations, provided by NOAA assets, partner assets or commercially procured, are most critical for weather forecasting, environmental monitoring, climate monitoring, and to help inform public watches and warnings. A resilient constellation of low earth orbiting satellites, which can be quickly deployed to mitigate the risk of on-orbit failures, are essential for improving life-saving weather forecasts and warnings.

The LEO Subactivity will support implementation of the NOAA Satellite Observing System Architecture (NSOSA) study recommendations and be responsive to Congressional direction to improve weather forecast and prediction capabilities, as provided in the *Weather Research and Forecasting Innovation Act of 2017* (P.L. 115-25). In addition to acquiring new government-owned observing assets, LEO will allow NOAA to partner with other U.S. agencies, foreign governments, and private industry to provide critical LEO and future medium Earth observations, measurements and services. These cost-saving opportunities will improve NOAA's weather and environmental forecast capabilities and continue critical *in situ* data relay and search and rescue services. The investments made will evolve NESDIS' current architecture into one with more small and medium-sized satellites, individual instruments on commercial hosts, data buys, and an increased number of partnerships with domestic and foreign space agencies. NOAA will leverage emerging opportunities, new innovations and science within the commercial space industry when it becomes available.

LEO will support both the current generation of polar satellites, as well as the planning and development of NOAA's follow-on programs. LEO comprises services and data products from specific missions, as well as from enterprise products and services that are source-agnostic. This subactivity also includes ground system development and sustainment for LEO and for future medium Earth observations. NESDIS will maintain transparency into the development schedule, and the annual and life cycle costs for all major programs comprising the observing system elements.

The LEO Subactivity is divided into three Line Items:

- **Polar Weather Satellites (PWS) (www.jpss.noaa.gov):** PWS provides global meteorological observations to enable short-term (0-3 days), and mid-range (3-7 days) forecasts and warnings of severe weather events critical for emergency managers and communities to make timely decisions to protect life and property. In addition, PWS provides an array of global environmental observations for a wide variety of environmental phenomena that support and supplement seasonal monitoring

and forecasting of weather. Data and imagery obtained from PWS helps increase timeliness, accuracy, and cost effectiveness of public warnings and forecasts of climate and weather events. These observations include:

- Operational and short-term forecasts in Alaska;
- Severe storm and flood warnings;
- Tropical cyclone and hurricane warnings;
- Hydrologic forecasts;
- Ocean surface temperature, ocean color for ocean monitoring (e.g., reef conditions, harmful algal bloom warnings, etc.);
- Global sea level rise;
- Aviation forecasts (domestic, military, and international);
- Ice monitoring and forecasting;
- Ozone monitoring;
- Environmental air quality monitoring;
- Detection and analysis of wildfires and volcanic eruptions including volcanic ash warnings for aviation safety;
- Short-term and mesoscale forecasts;
- Seasonal and inter-annual climate forecasts;
- Decadal-scale monitoring of climate variability; and,
- Assessment of long-term global environmental change.

PWS contributes to international partnerships between the U.S. and the European and Japanese space agencies focusing on operational civilian polar-orbiting satellites that provide the primary input data for all numerical weather prediction (NWP) models. Polar satellites contribute ~85 percent of all data for NWP models. This program also supports risk reduction efforts for future polar requirements as part of its continuing work with SAE on future low Earth orbiting (LEO) architecture efforts.

PWS includes the NOAA/NASA Suomi NPP, the NOAA-20 (formerly known as JPSS-1), JPSS-2, JPSS-3, and JPSS-4 satellite missions. It also encompasses a large ground system with stations in the Antarctic, Norway, Alaska, New Mexico, Maryland and West Virginia, as well as the operational science, maintenance, and archiving for these missions through FY 2038 to ensure that NOAA continues to provide accurate and timely weather forecasts and warnings. NOAA/NASA Suomi NPP and NOAA-20 are currently operational in the early afternoon orbit. NOAA is currently building JPSS-2, -3, and -4, and developing JPSS-3 and JPSS-4 instruments and spacecraft buses as copies of JPSS-2. This allows NOAA to take advantage of the JPSS-2 instrument development and spacecraft bus contracts to reduce cost and risk. The NOAA JPSS-2, -3 and -4 missions are comprised of the Advanced Technology Microwave Sounder (ATMS), Cross-track Infrared Sounder (CrIS),

Visible Infrared Imaging Radiometer Suite (VIIRS), and the Ozone Mapping Profiler Suite-Nadir (OMPS-N) instruments. NASA's Radiation Budget Instrument (RBI) was demanifested from JPSS-2. NASA is now moving forward with a new instrument for radiation budget measurements, Libera, which will be included on JPSS-3. NOAA will also continue the development, maintenance, and sustainment of the ground systems, evolve ground systems to align with changing technologies and threats, and conduct risk reduction efforts to support current and future polar data acquisition requirements.

Starting in the fall of 2021, NOAA will start development of a new climate product, NOAA Unique Combined Atmospheric Processing System (NUCAPS), to improve global measurements of greenhouse gases (Methane, Carbon Dioxide, Ozone, Nitrogen Dioxide, others) from space. Based on an international agreement between NOAA and EUMETSAT, NOAA will receive hyperspectral sounding products from the European IASI-NG instrument following the launch of Metop-SG A1 satellite in October 2023. These observations can be combined with NASA, JAXA, ESA dedicated greenhouse gas missions. These dedicated missions identify the ground sources and sinks of greenhouse gases while the NOAA greenhouse gas products from JPSS and EUMETSAT satellites monitor transcontinental transport.

- **Cooperative Data and Rescue Services (CDARS): (**https://www.nesdis.noaa.gov/OPPA/argos-adcs.php**):** CDARS supports the space-based component of the Argos Data Collection and Location System (DCS). The Argos Data Collection System (DCS) is a data collection and relay program that provides global coverage and platform location services dedicated to studying and protecting the environment. The Argos system supports a wide variety of applications, including environmental monitoring, marine fisheries applications, and maritime security applications. The Argos system consists of DCS instruments that are hosted on polar-orbiting satellites operated by EUMETSAT, the Indian Space Research Organisation, and NOAA in three sun-synchronous orbits that ensure timely reporting at all latitudes. The Argos DCS meteorological-oceanographic platforms contribute daily *in situ* observations for use by numerical weather prediction, ocean, and climate models around the world.

  The current DCS instruments on the NOAA polar-orbiting satellites (NOAA-15,-18,-19) are operating well beyond their design life. To provide continuity of service, the NOAA CDARS program, under an international agreement with the French space agency Centre National d'Etudes Spatiales (CNES), will launch the next Argos DCS payload (Argos-4), built and provided by CNES, on a commercial spacecraft using a U.S. Air Force Hosted Payload Solutions (HoPS) contract. In 2018, a delivery order was awarded to General Atomics to integrate and launch the Argos-4 payload on the Orbital Test Bed-3 spacecraft in 2022.

- **Constellation Observing System for Meteorology, Ionosphere, and Climate (COSMIC)-2 / Global Navigation Satellite System (GNSS) Radio Occultation (RO):** COSMIC-2/GNSS RO observations use signals of opportunity from GNSS sources such as the U.S. Global Positioning System (GPS) to measure environmental parameters as Earth's atmosphere occults the GNSS source. Enhanced satellite configurations and new methods of GNSS signal processing can yield additional environmental parameters from reflections of these signals of opportunity off of ocean and land surface. The measurements support the NWS mission to provide weather, water, climate, and space weather forecasts for the protection of life, property, and enhancement of the national economy. RO is one of the most impactful observations for medium and long-term forecast skill. It also yields measurements of the ionosphere which are important for space weather prediction.

  The COSMIC-2/GNSS RO program seeks to provide consistent global geographically and temporally distributed RO sounding profiles to NWS to improve forecast quality. NOAA participates in the COSMIC-2 collaboration with Taiwan and the U.S. Air Force (USAF). COSMIC-2 is a six-satellite constellation of spacecraft with RO instruments launched to the equatorial orbit by USAF on June 25, 2019. The USAF provided the RO sensors while Taiwan provided the spacecraft and serves as the satellite operator. NOAA operates a ground system consisting of a network of ground reception stations and a RO data processing center. NOAA also has data access partnerships to acquire satellite-based GNSS data from other agencies, including NASA, EUMETSAT, German Aerospace Center (DLR), Japanese Aerospace Exploration Agency (JAXA), the Korea Aerospace Research Institute (KARI), and the Spanish National Research Council. NOAA will continue to pursue other partnerships to receive RO data as they are available. The COSMIC-2/GNSS RO program is currently leveraging NOAA's ground system for timely acquisition and processing of satellite-based GNSS data from these partner agencies. The program will assist NOAA and partner agencies efforts to improve the on-orbit performance of satellite instruments that exploit GNSS signals of opportunity, to host these instruments on new satellites, and to better use the data in terrestrial and space weather applications.

Space Weather Observations (SWO): Since its start, NOAA has deployed space weather monitoring and warning capability as part of its mission to monitor the environment and issue watches and warnings to protect lives and property. Space weather phenomena jeopardize the function of more than 2,000 space-borne satellites and linked ground systems that run telecommunications, airline and shipping navigation, financial services, oil and gas pipelines, and electrical generation and transmission -- ultimately threatening our nation's economic and national security. In 2016, EO 13744, Coordinating Efforts to Prepare the Nation for Space Weather Events, directed the DOC and therefore NOAA to "provide timely and accurate operational space weather forecasts, watches, warnings, alerts, and," and to "ensure the continuous improvement of operational space weather services." In 2020, the Promoting Research and Observations of Space Weather to Improve the Forecasting of Tomorrow (PROSWIFT) Act further authorized NOAA to sustain,

improve and expand space-based space weather observations.

SWO comprises services and data products from specific missions, as well as from enterprise products and services that are source-agnostic. This subactivity also includes ground system development and sustainment for SWO and for future space weather observations. SWO will manage future space weather observations as a portfolio, while maintaining transparency into the development schedule, and the annual and life cycle costs for all individual programs and projects comprising the observing system elements. The SWO portfolio will be coordinated with the Office of the Federal Coordinator for Meteorology, NWS, NASA, the Department of Defense, the National Science Foundation, our research and academic community, and our international partner satellite agencies.

- **Space Weather Follow On (SWFO):** SWFO is designed to meet NOAA's need for operational coronal mass ejection (CME) imagery and *in situ* solar wind measurements. NOAA is working to have instruments in place to address the very high risk of loss of these observations before legacy space-based systems cease to provide useful data. CME and solar wind measurements are necessary for NOAA to provide warnings for the two major types of space weather events that affect the Earth: solar radiation storms and geomagnetic storms. Satellites are mostly impacted by solar radiation storms. Commercial airlines are rerouted during solar radiation and/or geomagnetic storms. These storms cause communication blackouts and impacts to navigation accuracy. The most extreme geomagnetic storms have resulted in severe impacts to commercial power grids and impacted hundreds of millions of people. Satellite data, including CME imagery and measurement of solar wind plasma, are critical to providing accurate and early warnings of these potentially destructive space weather events. Requirements for these measurements derive from the NOAA Space Weather Mission Service Area Observational User Requirements Document baselined by the NOAA Observing System Council in November 2017.

  Currently, CME measurements at the Earth-Sun Lagrange-1 (L1) point are provided only by the NASA-European Space Agency research Solar and Heliospheric Observatory (SOHO) that was launched in 1995. SOHO is more than 25 years old and is operating well past its mission design life. Without CME imagery, the 1-4 day lead-time of likely storm conditions will be degraded, thereby affecting the accuracy of geomagnetic storm watches and endangering U.S. infrastructure. SWFO design ensures the continuity of CME imagery for operational use by the NWS Space Weather Prediction Center for geomagnetic storm watches beyond SOHO. NOAA is working with the Naval Research Laboratory to develop flight compact coronagraphs (CCOR) to obtain CME imagery necessary for tracking eruptive events from the sun and provide initial estimates of the likelihood and severity of any impacts to Earth.

  NOAA will also replenish the capability of detecting solar wind upstream from Earth. Currently, solar wind measuring

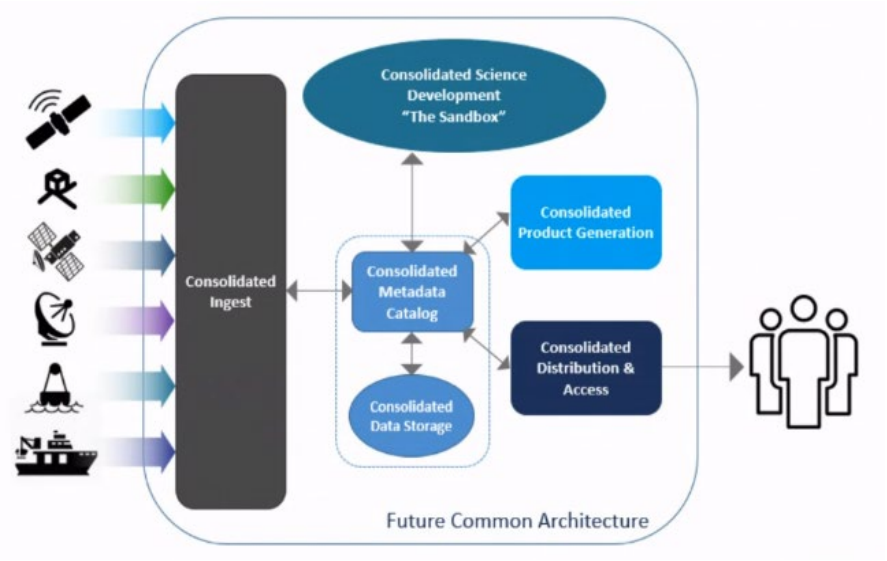
capability is provided by NOAA's Deep Space Climate Observatory (DSCOVR), with the over 25-year-old Advanced Composition Explorer (ACE) providing backup. However, DSCOVR is a research-grade satellite, also past its mission life, and is susceptible to mission failure with the loss of any of several single string critical components. Loss of DSCOVR without a ready replacement will significantly reduce NOAA's ability to monitor solar wind and provide short-term warnings (15-45 minutes) of space weather storms. The Solar Wind Instrument Suite (SWIS) to be accommodated on the SWFO-L1 satellite mission will provide the required solar wind data. The SWIS will include a Solar Wind Plasma Sensor (SWiPS), a set of magnetometers (MAG), and a low-energy ion spectrometer called the SupraThermal Ion Sensor (STIS).

The SWFO Program will use a rideshare opportunity with NASA's Interstellar Mapping and Acceleration Probe (IMAP) mission scheduled for launch in 2025. NOAA has established an interagency agreement with NASA for assisted acquisition of the SWFO-L1 spacecraft and the SWIS instruments. NOAA is developing the ground segment including NOAA acquisition of the command and control for mission operations, acquisition of the SWFO Antenna Network for continuous real time data acquisition, and the product generation and distribution capability to distribute products to operational and retrospective users. The Naval Research Laboratory, with NOAA oversight, is responsible for the development and delivery of the CCOR instruments under an interagency agreement. One CCOR will be accommodated on the SWFO-L1 mission that will co-manifest as a rideshare on the IMAP launch. The second CCOR will be hosted on the GOES-U satellite which plans to launch in 2024. Flying a second CCOR in a geostationary orbit adds operational resilience and reliability to the CME imagery necessary for space weather warnings and forecasting.

The SWFO Program successfully completed the Milestone 2/3 review October 31, 2019. On November 19, 2019, the Deputy Secretary of Commerce signed the SWFO Milestone 2/3 Decision Memorandum establishing the program baseline.

Common Ground Services (CGS): CGS plans and executes common ground services for NOAA's satellite, data, and information capabilities. Ground services are critical to acquiring, processing, and managing the environmental data from satellite missions and deriving value from the investments other organizations have made in the space segment. CGS facilitates access to non-NOAA domestic and international satellites, as well as supports commercially-acquired data. In collaboration with NCEI, CGS also supports data stewardship and provides long-term archive services for all approved NOAA and external partners' environmental data sources.

CGS core responsibilities include: developing and sustaining the NESDIS Common Cloud Framework (NCCF), which facilitates ingest and processing of data from non-NOAA sources and product portfolio management to ensure delivery of high priority products aligned with user needs. CGS activities also include planning cloud-related acquisitions, development to sustain on premise systems prior to transition to the cloud, integration, transition to operations, and overall sustainment of common ground services. CGS provides engineering and project management for ground systems/services design, development, integration and testing, migration of on-premise capabilities to a public cloud solution, and associated infrastructure. In addition, CGS participates in system verification and validation efforts, as well as life cycle reviews for major satellite acquisition programs and projects.



In FY 2021, NOAA implemented Data-source Agnostic Common Services (DACS), a cloud-enabled, end-to-end ground service capability that provides a secure, scalable, cost effective, portfolio approach of managing NOAA's data. DACS evolves the ground service enterprise to leverage cloud computing for data ingest, processing, dissemination, and archive. It allows NOAA to utilize data and observations from an increasingly capable and diverse array of partner and commercial systems to meet mission requirements in a cost-effective manner, and provides a framework for managing all of NESDIS data. NOAA transitioned initial operational services to a cloud architecture in FY 2021 after the successful completion of the FY 2019 and FY 2020 Cloud Pilots. The cloud architecture is more efficient, flexible, and scalable than on-premise systems and enables advanced processing capabilities, such as artificial intelligence and machine learning. DACS includes a secure operational ingest service (OSIS), and the newly implemented product generation capability. OSIS allows for the secure operational ingest of partner data, such as EUMETSAT Metop-SG.

Overall, the cloud-enabled DACS will continue to expand to include archive and stewardship of NOAA's satellite holdings as well expand dissemination services from the cloud. In addition to resolving many data access and latency issues and providing nearly unlimited scalability, NOAA data in the cloud can significantly reduce costs and expand the size and diversity of NOAA user

communities and data applications.

Systems/Services Architecture & Engineering (SAE): SAE provides analysis based on emerging capabilities and user needs to identify the highest value approaches to the NESDIS enterprise architecture, including flight, ground, and related services, to meet NESDIS, NOAA, and National needs. SAE ensures NESDIS-wide activities are aligned to the enterprise architecture vision, including managing the mission concept development activities for the next generation LEO, GEO, and SWO programs; creating and maintaining NESDIS-wide systems engineering and program management policies and procedures; governing the suite of products and services NESDIS provides to users from our own systems, partner systems, and commercial data to optimally meet user needs; and managing NESDIS-wide risk assessments and strategic plan implementation. SAE also manages the Commercial Data Program and Joint Venture Partnerships.

- **Architecture, Requirements, & Planning:** leads and manages NESDIS's assessments of and planning for future enterprise architectures to meet NESDIS Level Requirements. This includes performing trade studies with industry, pre-formulation activities, and demonstrations, as well as developing roadmaps for achieving future architectures. Starting from the foundation of the NESDIS Level Requirements, Architecture, Requirements, and Planning manages the NESDIS requirements development and change process for NESDIS level and program level requirements, leads the prioritization and governance process for managing NESDIS's baseline products and services, and validates that baseline products are meeting requirements. Architecture, Requirements, & Planning also guides NESDIS in the implementation of its strategic plan, interfaces with other agencies in service to NESDIS strategic goals, manages the NESDIS enterprise risk process, and develops and maintains systems engineering and program management guidance applicable to all NESDIS programs and activities.

The Architecture, Requirements, & Planning responsibilities also include:

- Undertaking quantitative assessments for objective analyses to evaluate relative value and benefits of future data sources and satellite architectures;
- Creating and implementing NESDIS enterprise policies, processes and procedures for alignment of systems engineering and project management activities across all of the agency;
- Providing an independent assessment to the milestone decision authority for all DOC Acquisition Milestones and NASA Key Decision Points and other milestones to ensure systemic compliance with architecture and effective implementation of requirements; and,

- Managing the implementation of the NOAA Administrative Order 212-16 "Observing Systems Portfolio Management," including validation of NOAA observation requirements, and conducting observing system impact and portfolio analyses. The NOAA Technology, Planning and Integration for Observation team supports all branches of NOAA and manages the NOAA Observing System Integrated Analysis, which is used to manage NOAA's current and future observing system investments.

- **Commercial Data Program:** The NOAA Commercial Space Policy calls for NOAA to: 1) undertake pilot projects to demonstrate the ability of the commercial sector to establish and sustain capabilities to meet NOAA's ongoing operational needs, and 2) to purchase commercial data to support those operational needs once a pilot project has successfully demonstrated the commercial sector's capability and readiness. NESDIS conducts both of these activities via the Commercial Data Program.

  NESDIS regularly conducts assessments to determine the viability of commercial solutions to address NOAA observing system objectives prior to considering the purchase of commercial data for operational use. NOAA conducted the Commercial Weather Data Pilot (CWDP) Round 1 in 2016-2018, as well as an expanded CWDP Round 2 in 2018-2020, both focused on demonstrating radio occultation data. NOAA used Round 2 of the CWDP to confirm the readiness of the commercial sector to provide Global Navigation Satellite System Radio Occultation (GNSS-RO) data. NOAA last issued a request for information in 2020 to inform Round 3 of the CWDP.

  The Commercial Data Program also assesses new types of data and capabilities that are available on the commercial market. Through CWDP, NESDIS will continue to:
  - Test commercially available capabilities to assess the accuracy, value, and impact of the commercial data or service - to the extent possible, such capabilities will be evaluated by comparison to established and validated NOAA operational products and deliverables;
  - Ensure the necessary ground systems, services, IT security interfaces, and data processing are in place for ingesting the commercial data selected; and,
  - Deliver assessment report(s) on the viability of the pilot data set(s) and the capabilities of the commercial systems to meet NOAA observation requirements for operational services.

  If NOAA determines that data or services licensed and evaluated through the CWDP are cost effective, operationally viable, and appropriate for meeting a NOAA observation requirement, NESDIS will pursue purchase of the commercial data or service via the Commercial Data Purchase, within the Commercial Data Program. Based on a successful Round 2 pilot, NOAA initiated

operational data purchases to include GNSS-RO data in NOAA's numerical weather prediction models via an Indefinite Delivery Indefinite Quantity (IDIQ) contract in 2020. NOAA plans to initiate operational use of GNSS-RO data in May 2021 and to continue operational purchases of GNSS-RO data via the ongoing IDIQ contracts.

Critical to the purchase of commercial data, NOAA will consistently evaluate the quality of the data offerings and assess the on-going impact of the commercial data on NOAA's mission objectives.

- **Joint Venture Partnerships:** The *National Integrated Drought Information System Reauthorization Act of 2018* amends the *Weather Research and Forecasting Innovation Act of 2017* and directs NOAA to analyze data sources that can lower the cost of observations or provide value-adding technological advancements to improve climate and weather forecasting. Partners in industry and other government agencies are key to NESDIS's ability to meet this mandate.

  Joint Venture Partnerships was established in FY 2020 to initiate activities with NASA, other agencies, and the commercial sector. Joint Venture Partnerships enables a consistent, prioritized approach across NESDIS, based on enterprise-wide architecture analysis, to initiate new NOAA programs, leverage partner data, and operationalize new technologies. Joint Venture leverages the ongoing work of NOAA's U.S. government agency partners and industry to meet NOAA needs, with the potential for large return on investment of NOAA funds, and is the first critical step in designing any new NOAA system, leveraging any partner data source, and making use of any new technology.

  Through Joint Venture Partnerships, NESDIS leverages capabilities being developed by other federal partners & industry in four areas: exploiting partner data, exploiting partner technologies, partnering to supplement other agencies' initiatives, and initial concept development to operationalize new data & technology. Specifically, Joint Venture Partnerships allows NESDIS to:
    - Assess non-NOAA data sources, including NASA's Earth Science and Heliophysics satellite programs and Department of Defense space-based environmental monitoring capabilities, for incorporation into NOAA operations;
    - Evaluate new technology for incorporation into NOAA operations;
    - Support other Federal Agency's data and technology development to cost effectively meet NOAA needs, including co-implementing NASA Announcements of Opportunity such as Earth Venture and Earth Science Technology Office opportunities. NOAA's support funds unique operational characteristics for the selected capabilities, such as download bandwidth, ingest and processing of data on operational timelines, and the development of operational algorithms for NOAA use;
    - Determine the best concepts to transition to operations by leveraging ongoing industry development of new observation capabilities, spacecraft design, and/or ground system capabilities. NESDIS will use additional Broad

Agency Announcements or other contract actions to industry and academia as the basis of NOAA's future satellite systems mission and instrument concept assessment and design.

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Geostationary Earth	Pos./BA	47	344,500	47	345,500	0	1,000
Orbit (GEO)	FTE/OBL	47	344,500	47	345,500	0	1,000

GOES-R Series Sustainment (+$1,000, 0 FTE/ 0 Positions) - NOAA proposes a planned increase for the near-term sustainment funds in the GOES-R Series program. These funds will continue sustainment of the GOES-R Series Ground System, including replacement of the IBM servers, in compliance with requirements under the *Consolidated Appropriations Act, 2014* (P.L.113-76), which limit DOC, DOJ, NASA, and NSF from using appropriated funds to acquire a high- or moderate-impact system produced, manufactured, or assembled by China.

NOAA's satellites collect essential data that serve as a long-term record for monitoring key climate parameters, and there is increasing demand for NOAA's satellite operations to collect more accurate information and expand observing capacity. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022
- Launch GOES-T and conduct post launch checkout and calibration activities
- Complete GOES-T product validation and transition GOES-T to operations
- Continue GOES-U Integration and Testing (I&T)
- Continue sustainment of the GOES-R Series Ground System, including continuing the replacement of IBM servers

FY 2023
- Continue GOES-U I&T
- Complete the replacement of IBM servers
- Award follow-on contract for sustainment of the GOES-R Series Ground System

FY 2024

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

- Complete GOES-U I&T
- Ship GOES-U to launch base and prepare to launch GOES-U

FY 2025

- Launch GOES-U and conduct post launch checkout and calibration activities
- Complete GOES-U product validation and transition GOES-U to operations

FY 2026

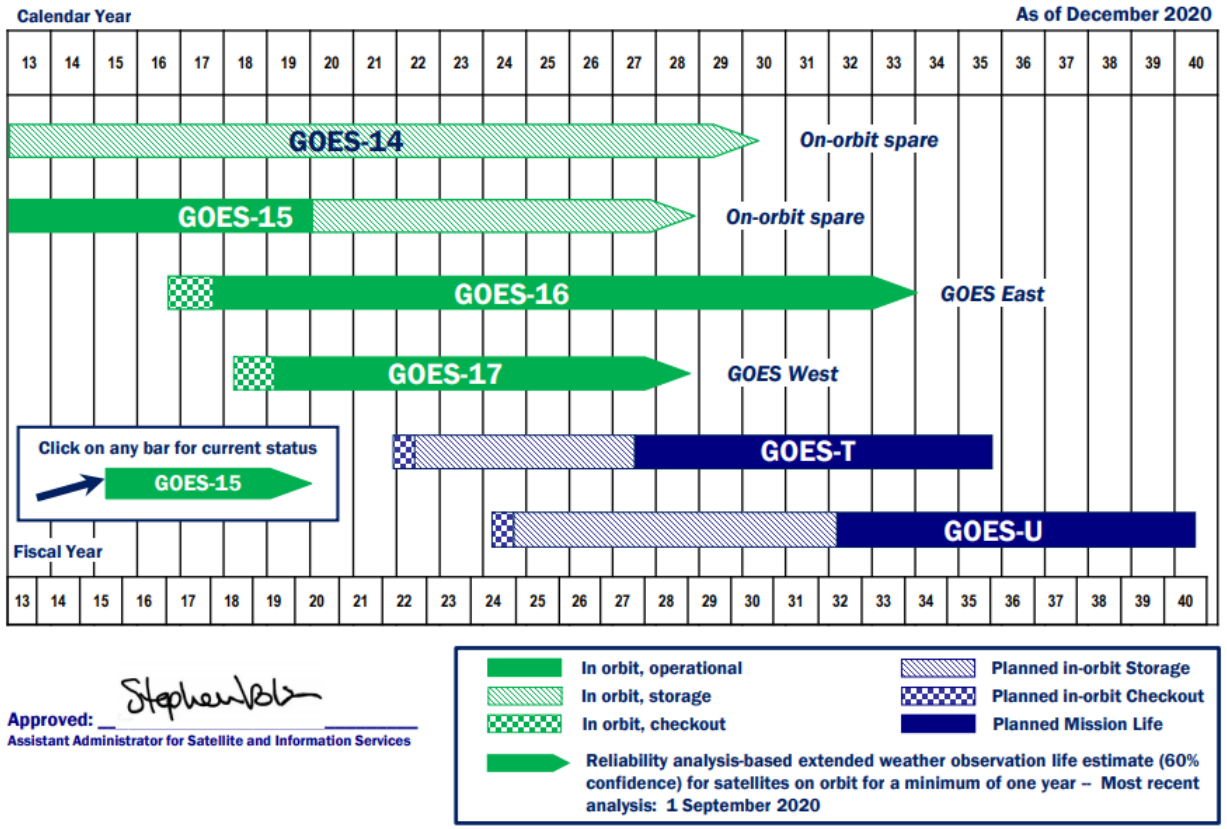
- Sustainment activities

Deliverables:

Spacecraft*	Launch Commitment Date	Target Launch Date
GOES-T	Q4 FY 2022	Dec 2021
GOES-U	Q1 FY 2025	TBD**

*Launch Readiness Dates were previously reported due to their relevance in contingency mission discussions. NOAA will no longer be reporting them to remain consistent with the Annual Satellite Reports.
**The GOES-U target launch date will be identified in coordination with the launch services provider within 3-years of the Launch Commitment Date.

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)



Approved: _____
Assistant Administrator for Satellite and Information Services

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Percent of milestones completed on time					
With Increase	75%	75%	75%	75%	75%
Without Increase	75%	75%	75%	75%	75%
Outyear Costs:					
Direct Obligations	1,000	(58,500)	(62,000)	(210,000)	(236,000)
Capitalized	1,000	(58,500)	(62,000)	(210,000)	(236,000)
Uncapitalized	0	0	0	0	0
Budget Authority	1,000	(58,500)	(62,000)	(210,000)	(236,000)
Outlays	400	(24,570)	(26,040)	(88,200)	(99,120)
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Outyear Funding Estimates*

GEO	2021 & Prior**	2022	2023*	2024*	2025*	2026*	CTC	Total
Change from 2022 Base	N/A	1,000	(58,500)	(62,000)	(210,000)	(236,000)	N/A	N/A
Total GOES-R Series PAC Request	9,242,959	335,500	276,000	272,500	124,500	98,500	672,128	11,022,087
Total GOES-R Series ORF Request	169,500	33,900	33,900	33,900	33,900	33,900	339,000	678,000
GOES-R Series LCC (PAC & ORF)**	9,412,459	369,400	309,900	306,400	158,400	132,400	1,011,128	11,700,087
Total other GEO Programs (PAC)^	**20,000**	**465,000**	**490,000**	**545,000**	**780,000**	**790,000**	**TBD**	**TBD**
Total GEO Request (PAC)^^	**9,462,959**	**800,500**	**766,000**	**817,500**	**904,500**	**888,500**	**TBD**	**TBD**

* Outyears are estimates. Future requests will be determined through the annual budget process.
** The FY 2021 & Prior column has been adjusted to account for the FY 2021 spend plan, including the mandatory deobligation assessment.
^Total other GEO Programs includes GeoXO and includes the requested increase on NESDIS-101.
^^ Total GEO Request includes GOES-R Series and GeoXO PAC funding only.

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Systems Acquisition
Subactivity: Geostationary Earth Orbit (GEO) – GOES-R Series Sustainment

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	8,385	8,469	8,469	8,469	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	40	40	40	40	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	8,425	8,509	8,509	8,509	0
12	Civilian personnel benefits	2,696	2,723	2,723	2,723	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	382	382	382	382	0
22	Transportation of things	1	1	1	1	0
23	Rent, communications, and utilities	0	0	0	0	0
23.1	Rental payments to GSA	390	390	390	390	0
23.2	Rental Payments to others	2	2	2	2	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	1	1	1	1	0
25.1	Advisory and assistance services	4,823	4,823	4,823	4,823	0
25.2	Other services from non-Federal sources	10,591	10,591	10,591	10,591	0
25.3	Other goods and services from Federal sources	258,990	289,323	289,323	290,323	1,000
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	625	625	625	625	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	5	5	5	5	0
31	Equipment	20,328	20,328	20,328	20,328	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	6,797	6,797	6,797	6,797	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	314,056	344,500	344,500	345,500	1,000

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Geostationary Earth Orbit (GEO)	Pos./BA	47	344,500	53	799,500	6	455,000
	FTE/OBL	47	344,500	51	799,500	4	455,000

Geostationary Extended Observations (GeoXO) (+$455,000, 4 FTE/ 6 Positions) – NOAA requests an increase of $455.0 million, for a total of $465.0 million, for the Geostationary Extended Observations (GeoXO) satellite program. GeoXO advances NOAA's weather, ocean, and climate observational capabilities to support necessary U.S. forecasting and prediction operations. GeoXO will continue and expand observations provided by the GOES-R Series, bringing new capabilities to address emerging environmental issues and challenges that threaten the security and well-being of every American.

Weather forecasting yields a $162 Billion/year[5] benefit to the global economy with current U.S. geostationary satellites (GOES-R Series) providing an estimated ~14 percent[6] of the benefit. Data from GeoXO will contribute to weather forecast models and drive short-term weather forecasts and severe weather warnings. GeoXO will also provide advanced detection and monitoring of environmental hazards, such as wildfires, smoke, fog, dust, volcanic ash, drought, flooding, sea ice, and harmful algal blooms. These observations will provide vital data to complement those from NOAA's partners in Europe and Asia, building a critical global observing system.

In FY 2021, pre-formulation studies with industry evaluated advanced instrument capabilities and assessed architecture concepts including the role of hosting on commercial spacecraft, commercial data purchases, and the use of multiple small low Earth orbit satellites to meet very low latency observational requirements typically met by geostationary satellites. In FY 2022, Phase A formulation studies will be initiated with industry for all proposed GeoXO instruments (imager, sounder, lightning mapper, sounder,

[5] "The Value of Surface-based Meteorological Observation Data" WMO/WorldBank 2021.
[6] NOAA estimated the benefit provided by U.S. geostationary satellites based on figures included within "The Value of Surface-based Meteorological Observation Data" (WMO/WorldBank 2021). The authors estimated the minimum global socioeconomic valuation of the benefits of weather prediction is $162 Billion per year (pg. 16), of which 75.9 percent is from space-based assets (pg. 19). The U.S. contributes 45 percent of space-based assets (Figure 6, pg. 19), of which 40 percent (based on a NOAA-conducted Forecast Sensitivity to Observation in Observing System Simulation Estimate) are GEO assets.

ocean color, and atmospheric composition instruments), as well as for the spacecraft. These Phase A industry studies will provide the data needed to evaluate expected instrument cost and expected performance. NOAA will complete comprehensive instrument and system cost/benefits analyses to inform the upcoming programmatic Milestone II, which authorizes the next stage of the GeoXO program development. Following Milestone II, NOAA will initiate the GeoXO instrument and spacecraft implementation contracts starting in FY 2023.

NOAA's satellites collect essential data that support essential extreme weather events forecasts and warnings, and serve as a long-term record for monitoring key climate parameters. There is increasing demand for NOAA's satellite operations to collect more accurate information and expand observing capacity. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:

FY 2022

- Initiate industry competitive Phase A studies for GeoXO instruments
- Initiate industry competitive Phase A studies of next generation GEO spacecraft
- Complete GeoXO Systems Requirements Review
- Finalize instrument requirements for implementation of next gen GEO instruments and complete acquisition strategy decision
- Complete GeoXO Milestone 2

FY 2023

- Complete industry competitive Phase A studies of next gen GEO instruments and spacecraft
- Initiate procurements activities for instrument and spacecraft development (phase B-D)

FY 2024

- Complete GeoXO System Definition Review and Key Decision Point B

FY 2025

- Complete GeoXO mission Preliminary Design Review, Key Decision Point C, and Milestone 3.
- Initiate procurement activities for GeoXO Ground System.

FY 2026

- Begin instrument Critical Design Reviews.

Deliverables:

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

- Final GeoXO constellation architecture
- Complete DOC Acquisition Milestone 2 establishing the cost, schedule, and performance baseline.

Performance Measures	2022	2023	2024	2025	2026
Percent of milestones completed on time					
With Increase	75%	75%	75%	75%	75%
Without Increase	0%	0%	0%	0%	0%
Outyear Costs:					
Direct Obligations	455,000	480,000	535,000	770,000	780,000
Capitalized	455,000	480,000	535,000	770,000	780,000
Uncapitalized	0	0	0	0	0
Budget Authority	455,000	480,000	535,000	770,000	780,000
Outlays	191,100	201,600	224,700	323,400	327,600
FTE	4	6	6	6	6
Positions	6	6	6	6	6

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Outyear Funding Estimates*

GEO	2021 & Prior**	2022	2023*	2024*	2025*	2026*	CTC	Total
Change from 2022 Base	N/A	455,000	480,000	535,000	770,000	780,000	TBD	TBD
Total GeoXO Request	20,000	465,000	490,000	545,000	780,000	790,000	TBD	TBD
Total other GEO Programs (PAC)^	9,242,959	335,500	276,000	272,500	124,500	98,500	672,128	11,022,087
Total GEO Request^^	**9,462,959**	**800,500**	**766,000**	**817,500**	**904,500**	**888,500**	**TBD**	**TBD**

* Outyears are estimates. Future requests will be determined through the annual budget process and informed by the various studies as the program moves through the formulation gateways.
** The FY 2021 & Prior column has been adjusted to account for the FY 2021 spend plan, including the mandatory deobligation assessment.
^Total other GEO Programs includes GOES-R Series. The funding profile reflects the approved life cycle cost estimate, including the requested planned program increase on NESDIS-95.
^^ Total GEO Request includes GOES-R Series and GeoXO PAC funding only.

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National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM CHANGE PERSONNEL DETAIL
(Dollar amounts in thousands)

Activity: Systems Acquisition
Subactivity: Geostationary Earth Orbit (GEO) – Geostationary Extended Observations (GeoXO)

Title		Grade	Number	Annual Salary	Total Salaries
General Engineer		ZP-IV	2	128,400	256,800
Supervisory Engineer		ZP-V	1	156,700	156,700
Physical Scientist		ZP-IV	1	128,400	128,400
Supervisroy Physical Scientist		ZP-V	1	156,700	156,700
Budget Analyst		ZP-IV	1	128,400	128,400
Total			6		827,000
Less lapse	25.00%		(2)		(206,750)
Total full-time permanent (FTE)			4		620,250
2022 Pay Adjustment (2.7%)					16,747
					636,997

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	4
Total FTE	4
Authorized Positions:	
Full-time permanent	6
Total Positions	6

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National Oceanic and Atmospheric Administration
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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Systems Acquisition
Subactivity: Geostationary Earth Orbit (GEO) – Geostationary Extended Observations (GeoXO)

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	8,385	8,469	8,469	9,106	637
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	40	40	40	40	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	8,425	8,509	8,509	9,146	637
12	Civilian personnel benefits	2,696	2,723	2,723	2,926	203
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	382	382	382	482	100
22	Transportation of things	1	1	1	1	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	390	390	390	390	0
23.2	Rental Payments to others	2	2	2	2	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	1	1	1	1	0
25.1	Advisory and assistance services	4,823	4,823	4,823	4,823	0
25.2	Other services from non-Federal sources	10,591	10,591	10,591	10,591	0
25.3	Other goods and services from Federal sources	258,990	289,323	289,323	720,383	431,060
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	625	625	625	625	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	5	5	5	5	0
31	Equipment	20,328	20,328	20,328	43,328	23,000
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	6,797	6,797	6,797	6,797	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	314,056	344,500	344,500	799,500	455,000

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Procurement, Acquisition, and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Low Earth Orbit (LEO)	Pos./BA	95	678,127	95	425,292	0	(252,835)
	FTE/OBL	93	678,127	93	425,292	0	(252,835)

Polar Weather Satellites (PWS) (-$252,835, 0 FTE/ 0 Positions) – NOAA proposes a planned decrease to PWS due to the rescheduled launch commitment dates applying to a five-year cadence. The launch vehicles will be purchased in future years reducing the current need.

NOAA completed the build of the JPSS-2 instruments and spacecraft, maintaining the JPSS-2 launch schedule. During FY 2022, NOAA will focus its efforts on the JPSS-2 launch and on development of the JPSS-3 instruments to keep NOAA's commitment for a robust polar orbiting weather satellite program. NOAA will continue the development of the spacecraft and ATMS, CrIS, VIIRS, and OMPS instruments for JPSS-3 and JPSS-4 in order to maintain synergies with JPSS-2 and efficiencies of the block buy approach for these elements of the PWS. NOAA will continue the maintenance and sustainment of the ground system supporting the Suomi NPP and NOAA-20 satellites and continue development and testing of the ground system to support JPSS-2. NOAA will also continue to work to refine its constellation strategy to assure PWS continuity.

NOAA's satellites collect essential data that serve as a long-term record for monitoring key climate parameters, and there is increasing demand for NOAA's satellite operations to collect more accurate information and expand observing capacity. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022
- Deliver JPSS-2 satellite to launch site
- Integrate ride-share missions for JPSS-2 launch
- Conduct JPSS-2 launch site integration and test in preparation for launch
- Launch JPSS-2

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

- Deliver JPSS-3 CrIS and VIIRS instruments
- Continue assembly, integration, and test of JPSS-3 spacecraft
- Conduct JPSS-4 VIIRS instrument level environmental testing
- Sustain and maintain Suomi NPP, NOAA-20
- Sustain and maintain ground system to support Suomi NPP, NOAA-20, and prepare for JPSS-2

FY 2023
- Commission and transition JPSS-2 to operations
- Conduct System Integration Review for JPSS-3
- Continue JPSS-4 instrument level environmental testing
- Initiate procurement of JPSS-3 launch services for Coupled Load Analysis
- Sustain and maintain NOAA-20 and JPSS-2
- Sustain and maintain ground system to support NOAA-20 and JPSS-2

FY 2024
- Deliver JPSS-4 instruments
- Sustain and maintain NOAA-20 and JPSS-2
- Sustain and maintain ground system to support NOAA-20 and JPSS-2

FY 2025
- Continue JPSS-4 satellite integration and testing
- Sustain and maintain ground system to support NOAA-20 and JPSS-2

FY 2026
- Place JPSS-4 satellite into storage
- Sustain and maintain ground system to support NOAA-20 and JPSS-2

Deliverables:
- JPSS-2 satellite for launch by Q1 FY 2023
- On-orbit support for Suomi NPP and NOAA-20

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Satellite*	Launch Commitment Date**	Target Launch Date***
JPSS-2	Q1 FY 2023	TBD
JPSS- 3**	Q1 FY 2028	TBD
JPSS-4**	Q1 FY 2033	TBD

** Launch commitment dates will be re-evaluated based on annual appropriations, the performance of on-orbit assets, and the overall constellation risk posture.
*** Target Launch Date is only known after coordination with the launch services provider and in accordance with the NESDIS 1330 Polar-Orbiting Launch Policy.

Department of Commerce
National Oceanic and Atmospheric Administration
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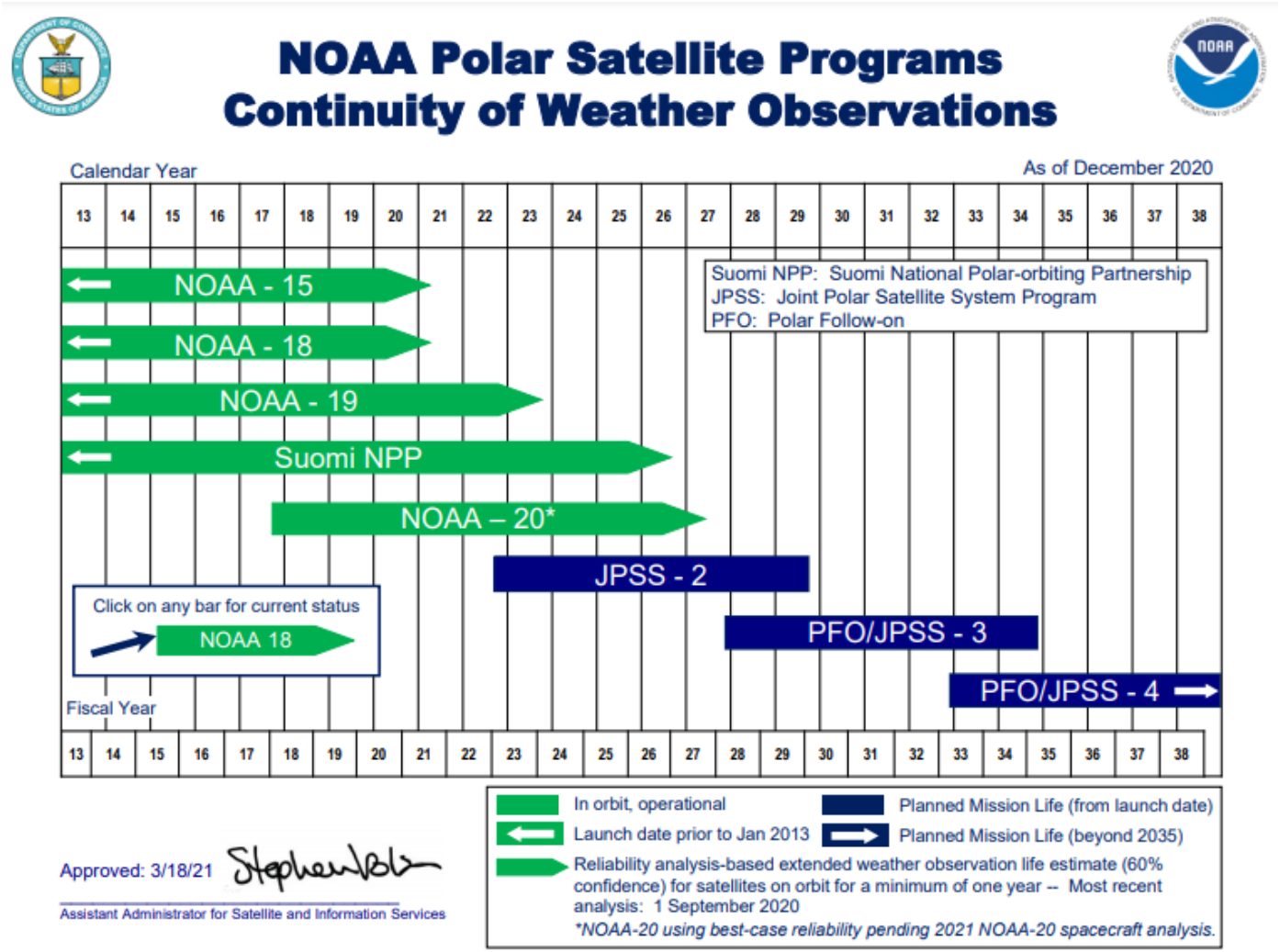
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)



For an interactive fly out chart, with the current operating status of NOAA satellites, please visit: https://www.nesdis.noaa.gov/content/our-satellites

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Procurement, Acquisition, and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Percent of milestones completed on time					
With Decrease	75%	75%	75%	75%	75%
Without Decrease	75%	75%	75%	75%	75%
Outyear Costs:					
Direct Obligations	(252,835)	(252,835)	(252,835)	(252,835)	(232,835)
Capitalized	0	0	0	0	0
Uncapitalized	(252,835)	(252,835)	(252,835)	(252,835)	(232,835)
Budget Authority	(252,835)	(252,835)	(252,835)	(252,835)	(232,835)
Outlays	(106,190)	(106,190)	(106,190)	(106,190)	(97,791)
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Outyear Funding Estimates

PWS	2021 & Prior	2022*	2023*	2024*	2025*	2026*	CTC	Total
Change from 2022 PAC Base	N/A	(252,835)	(252,835)	(252,835)	(252,835)	(232,835)	N/A	N/A
PWS (PAC & ORF)	**12,613,724**	**425,000**	**425,000**	**425,000**	**425,000**	**425,000**	**3,287,241**	**18,025,965**
JPSS (ORF)	40,000	20,000	20,000	20,000	20,000	0	0	120,000
JPSS (PAC)^	10,541,565	180,000	180,000	105,000	61,500	0	0	11,068,065
PFO (ORF)	0	0	0	0	0	0	0	0
PFO (PAC)	2,032,159	225,000	225,000	300,000	343,500	425,000	3,287,241	6,837,900
Total Other LEO Programs (PAC)#	**115,554**	**107,730**	**97,918**	**99,780**	**99,976**	**102,175**	**TBD**	**TBD**
Total LEO Request (PAC)^^	**12,689,278**	**512,730**	**502,918**	**504,780**	**504,976**	**527,175**	**TBD**	**TBD**

* Outyears are estimates. Future requests will be based on current needs and requirements. Therefore, the PAC profile will be updated on an annual basis. Future year funding will be allocated efficiently between PFO and JPSS while remaining at or under each program's LCC baseline in total.

** The FY 2021 & Prior column accounts for the FY 2021 Enacted amount, as well as any reductions for deobligations.

^The difference between the requested budget through the end of the JPSS program and the LCC reflects a projected underrun. This projection is based on recent program execution performance, and is subject to reevaluation as conditions and circumstances warrant.

Total Other LEO Programs (PAC) includes LEO Weather Satellites, CDARS, COSMIC-2/GNSSRO, and POES Extension PAC funding only.

^^ Total LEO Request includes PWS, LEO Weather Satellites, CDARS, COSMIC-2/GNSSRO, and POES Extension PAC funding only

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National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM DECREASE FOR 2022
(Dollar amounts in thousands)

NOAA continues to make good progress on the JPSS portion of the PWS program, and at the current time projects an underrun of approximately $134 million against the LCC commitment of $11,322 million. There remain risks in the program going forward, with the scope to remain including integration and test of the JPSS-2 spacecraft, launch and on-orbit checkout of the satellite, and the completion of significant ground system upgrades. Unexpected but recoverable issues may occur, and, if they do, NOAA will reassess the projected funding required to complete the mission, within the established LCC for JPSS and the LEO Portfolio.

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Systems Acquisition
Subactivity: Low Earth Orbit (LEO) - Polar Weather Satellites (PWS)

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Decrease from 2022 Base
11.1	Full-time permanent compensation	11,076	10,291	10,291	10,291	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	92	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	11,168	10,291	10,291	10,291	0
12	Civilian personnel benefits	3,554	3,306	3,306	3,306	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	176	248	248	248	0
22	Transportation of things	4	0	0	0	0
23	Rent, communications, and utilitites	0	1,230	1,230	1,230	0
23.1	Rental payments to GSA	1,165	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	103	0	0	0	0
24	Printing and reproduction	8	40	40	40	0
25.1	Advisory and assistance services	94,888	5,695	5,695	5,695	0
25.2	Other services from non-Federal sources	18,002	2,284	2,284	2,284	0
25.3	Other goods and services from Federal sources	589,653	638,626	638,626	385,791	(252,835)
25.4	Operation and maintenance of facilities	3,292	0	0	0	0
25.5	Research and development contracts	12,782	0	0	0	0
25.6	Medical care	73	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	197	111	111	111	0
31	Equipment	421	549	549	549	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	22,266	15,747	15,747	15,747	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	11	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	757,763	678,127	678,127	425,292	(252,835)

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Low Earth Orbit	Pos./BA	95	678,127	102	756,457	7	78,330
(LEO)	FTE/OBL	93	678,127	98	756,457	5	78,330

LEO Weather Satellites (+$78,330, 5 FTE/ 7 Positions) – NOAA proposes to initiate a LEO Weather Satellites program that will complement the Polar Weather Satellite (PWS) program, and will ultimately serve as the follow-on to PWS to provide essential, sustained observations from LEO to meet NOAA mission needs. NOAA's LEO Weather Satellites will:

1) Explore the viability of small sounder satellites through an operational demonstration before use in an operational mission,
2) Provide resiliency for the PWS constellation of satellites in the event of an on-orbit failure, and
3) Fill the upcoming early morning orbit microwave sounder gap after the demise of NOAA's legacy POES satellites.

The 2018 NOAA Satellite Observing System Architecture study found that a disaggregated approach to LEO observations, including launching multiple small satellites in two to three orbits to provide sounding data, could significantly reduce costs and provide greater overall system reliability compared to the larger satellites of the JPSS era. NOAA anticipates that these small satellites will be developed and deployed much more quickly than JPSS, enabling the nation's polar observing satellite architecture to evolve to be more agile and resilient. LEO Weather Satellites will be responsive to the Congressional direction to improve weather forecasting and prediction capabilities, as provided in the Weather Research and Forecasting Innovation Act of 2017 (Public Law 115-25). Through timely innovation using rapid technology infusion, and an increase in data diversity by adding orbits, this will result in both improved value and cost savings.

NOAA proposes to prove out this new "smallsat" architecture via demonstration missions that will complement the existing operational PWS program. This approach to managing the long-term transition from PWS to LEO will allow NOAA to obtain critical lessons learned before adopting disaggregation in the post-JPSS era, while also establishing a more resilient near-term PWS constellation.

LEO weather satellites have the added benefit of addressing an emerging, near-term need to fill the upcoming early morning gap

once NOAA's legacy satellites go offline (See the POES Tech Refresh Program Change Increase for more information on POES ground sustainment needs). The legacy Polar Operational Environmental Satellites have drifted into the early morning orbit over time. Microwave sounding data from early morning orbits greatly benefits the accuracy of numerical weather prediction (NWP) models (Figure 2). Together, the early morning, mid-morning, and early afternoon orbits currently provide a distribution of sounding observations that are essential to the performance of NWP global models. These global models run every 6 hours, while their regional models run every hour. Without three primary orbits, NOAA cannot provide full global coverage every 6 hours, and the NOAA mission to provide accurate weather forecasts will be compromised. No other U.S. Government agency or commercial entity has plans to provide these observations in the early-morning orbit, nor do we expect them to before the POES satellites are retired. Our global partners are using data from the Chinese Meteorological Administration (CMA) to meet their long-term morning orbit sounding needs, but NOAA is currently prohibited from using environmental data from CMA sources. Given the importance of the early-morning orbit to NOAA's NWP models, NOAA requests funding to fill this observation gap.

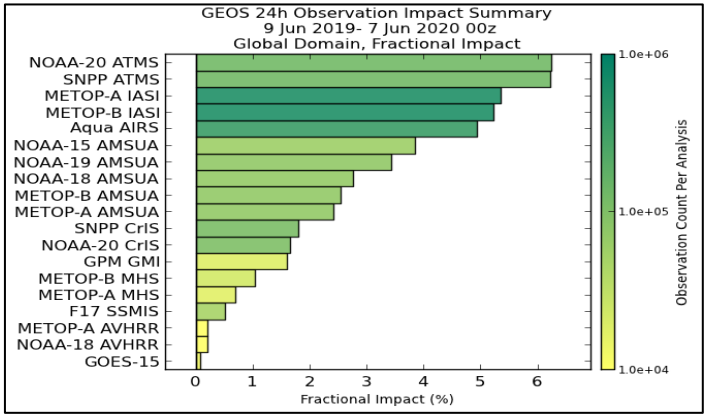

Figure 1: Relative impact of a satellite instrument's observation on reducing forecast error: *Early morning microwave sounders (AMSU) from POES satellites (NOAA-15 and -19) have a larger impact than the mid-morning equivalents on Metop.*

LEO Weather Satellites will be designed and developed as low-cost, rapid reaction payloads and buses, with space lift and launch control methods to meet requirements for on-demand regeneration. FY 2022 funds will support the instrument development studies, exploration of leveraging commercial capabilities, and exploration of innovative smallsat development approaches, including partnering with commercial entities. Understanding the opportunities and risks of commercial capabilities, including building spacecraft, launch vehicles, and ground services, is critical for developing and implementing a robust program to successfully meet mission requirements and will support the commercial aerospace sector's ability to meet future mission requirements. This work will build off of complementary efforts funded within the Joint Venture program.

The first launch of a LEO Weather Satellites mission will be a satellite capable of hosting a variety of environmental monitoring instruments, but will initially include, at minimum, a microwave vertical sounder with performance similar to ATMS. Based on our lessons learned from the first launch, future LEO Weather Satellites will likely incorporate a proven, multi-purpose spacecraft that can manifest a variety of instruments and include the development of instruments capable of being integrated on small satellites. This

approach will enable NOAA to put capabilities where and when needed while leveraging industry's innovation in a cost-efficient manner.

The program will begin in FY 2022 to ensure that a validated capability for observational data continuity is available prior to the end of the PWS program's satellites' lifetime.

NOAA's satellites collect essential data that serve as a long-term record for monitoring key climate parameters, and there is increasing demand for NOAA's satellite operations to collect more accurate information and expand observing capacity. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022
- Sounder Satellite Mission DOC Milestone 1 (Project Initiation Approval)
- Small satellite mission development optimization studies
- Sounder Satellite Authority To Proceed
- Sounder Satellite System Design Review

FY 2023 – FY 2026
- TBD

Deliverables:
- Sounder Satellite pathfinder mission

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Percent of milestones completed					
With increase	75%	75%	75%	75%	75%
Without increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	78,330	78,330	90,000	90,000	92,000
Capitalized	78,330	78,330	90,000	90,000	92,000
Uncapitalized	0	0	0	0	0
Budget Authority	78,330	78,330	90,000	90,000	92,000
Outlays	32,899	32,899	37,800	37,800	38,640
FTE	5	TBD	TBD	TBD	TBD
Positions	7	TBD	TBD	TBD	TBD

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Outyear Funding Estimates*

LEO	2021 & Prior	2022*	2023*	2024*	2025*	2026*	CTC	Total
Change from 2022 Base	N/A	78,330	78,330	90,000	90,000	92,000	N/A	N/A
Total LEO Weather Satellites Request	N/A	78,330	78,330	90,000	90,000	92,000	TBD	TBD
Total Other LEO Programs (PAC)#	**12,689,278**	**434,400**	**424,588**	**414,780**	**414,976**	**435,175**	**TBD**	**TBD**
Total LEO Request (PAC)^^	**12,689,278**	**512,730**	**502,918**	**504,780**	**504,976**	**527,175**	**TBD**	**TBD**

* Outyears are estimates. Future requests will be determined on an annual basis and informed by the various studies as the program moves through the formulation gateways.
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Total Other LEO Programs (PAC) includes PWS, CDARS, COSMIC-2/GNSSRO, and POES Extension PAC funding only.
^^ Total LEO Request includes PWS, LEO Weather Satellites, CDARS, COSMIC-2/GNSSRO, and POES Extension PAC funding only.

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PROGRAM CHANGE PERSONNEL DETAIL
(Dollar amounts in thousands)

Activity: Systems Acquisition
Subactivity: Low Earth Orbit (LEO) – LEO Weather Satellites

Title		Grade	Number	Annual Salary	Total Salaries
Program Manager		ZA-V	1	144,128	144,128
Financial Manager		ZA-V	1	144,128	144,128
Budget Analyst		ZA-III	1	72,750	72,750
General Engineer		ZP-IV	3	103,690	311,069
Physical Scientist		ZP-IV	1	103,690	103,690
Total			7		775,765
Less lapse	25.00%		(2)		(193,941)
Total full-time permanent (FTE)			5		581,824
2022 Pay Adjustment (2.7%)					15,709
					597,533

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	5
Total FTE	5
Authorized Positions:	
Full-time permanent	7
Total Positions	7

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Systems Acquisition
Subactivity: Low Earth Orbit (LEO) – LEO Weather Satellites

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Decrease from 2022 Base
11.1	Full-time permanent compensation	11,076	10,291	10,291	10,889	598
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	92	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	11,168	10,291	10,291	10,889	598
12	Civilian personnel benefits	3,554	3,306	3,306	3,497	191
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	176	248	248	248	0
22	Transportation of things	4	0	0	0	0
23	Rent, communications, and utilitites	0	1,230	1,230	1,230	0
23.1	Rental payments to GSA	1,165	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	103	0	0	0	0
24	Printing and reproduction	8	40	40	40	0
25.1	Advisory and assistance services	94,888	5,695	5,695	5,695	0
25.2	Other services from non-Federal sources	18,002	2,284	2,284	2,284	0
25.3	Other goods and services from Federal sources	589,653	638,626	638,626	716,167	77,541
25.4	Operation and maintenance of facilities	3,292	0	0	0	0
25.5	Research and development contracts	12,782	0	0	0	0
25.6	Medical care	73	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	197	111	111	111	0
31	Equipment	421	549	549	549	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	22,266	15,747	15,747	15,747	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	11	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	757,763	678,127	678,127	756,457	78,330

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(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Low Earth Orbit (LEO)	Pos./BA	95	678,127	92	665,027	(3)	(13,100)
	FTE/OBL	93	678,127	90	665,027	(3)	(13,100)

Cooperative Data and Rescue Services (CDARS) (-$13,100, 3 FTE/ 3 Positions) – NOAA requests a planned decrease due to completion of the integration and launch phases of the program. The three positions will shift from supporting CDARS to supporting other LEO projects (see the LEO Weather Satellites Program Increase Request, NESDIS-115). The remaining funding and personnel will continue post launch support for the USAF Hosted Payload Solutions of the Argos-4 Advanced Data Collection System (A-DCS) instrument provided by the French space agency Centre National d'Etudes Spatiales (CNES).

NOAA's satellites collect essential data that serve as a long-term record for monitoring key climate parameters, and there is increasing demand for NOAA's satellite operations to collect more accurate information and expand observing capacity. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:

FY 2022

- Launch of Host Spacecraft to the desired 1730 sun synchronous orbit
- Initiate Argos A-DCS operations

FY 2023 – FY 2026

- Continue operations & post launch support of A-DCS operations

Deliverables:

- Operation of the Argos-4 instrument in the desired 1730 sun synchronous orbit as a NOAA contribution to the joint

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(Dollar amounts in thousands)

international Argos system through FY 2026.

Performance Measures	2022	2023	2024	2025	2026
Percent of contract milestones completed on time					
With Decrease	75%	75%	75%	75%	75%
Without Decrease	75%	75%	75%	75%	75%

Description: Percentage of projected milestones to be completed annually to plan and implement accommodation of the A-DCS instrument. This includes key decision points, major reviews, testing accommodation using HoPS.

Outyear Costs:					
Direct Obligations	(13,100)	(13,074)	(13,047)	(13,020)	(12,993)
Capitalized	0	0	0	0	0
Uncapitalized	(13,100)	(13,074)	(13,047)	(13,020)	(12,993)
Budget Authority	(13,100)	(13,074)	(13,047)	(13,020)	(12,993)
Outlays	(5,502)	(5,491)	(5,480)	(5,468)	(5,457)
FTE	(3)	(3)	(3)	(3)	(3)
Positions	(3)	(3)	(3)	(3)	(3)

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(Dollar amounts in thousands)

Outyear Funding Estimates

LEO	2021 & Prior	2022*	2023*	2024*	2025*	2026*	CTC	Total
Change from 2022 Base	N/A	(13,100)	(13,074)	(13,047)	(13,020)	(12,993)	TBD	TBD
Total CDARS Request	64,529	1,300	1,326	1,353	1,380	1,407	TBD	TBD
Total Other LEO Programs (PAC)#	**12,624,749**	**511,430**	**501,592**	**503,427**	**503,596**	**525,768**	**TBD**	**TBD**
Total LEO Request (PAC)^^	**12,689,278**	**512,730**	**502,918**	**504,780**	**504,976**	**527,175**	**TBD**	**TBD**

* Outyears are estimates only. Future requests will be determined through the annual budget process.
# Total Other LEO Programs (PAC) includes PWS, LEO Weather Satellites, COSMIC-2/GNSSRO, and POES Extension PAC funding only.
^^ Total LEO Request includes PWS, LEO Weather Satellites, CDARS, COSMIC-2/GNSSRO, and POES Extension PAC funding only.

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Systems Acquisition
Subactivity: Low Earth Orbit (LEO) – Cooperative Data and Rescue Services (CDARS)

Title		Grade	Number	Annual Salary	Total Salaries
General Engineer		ZP-V	(1)	144,100	(144,100)
General Engineer		ZP-IV	(1)	103,700	(103,700)
General Engineer		ZP-IV	(1)	103,700	(103,700)
Total			(3)		(351,500)
Less lapse	0.00%		0		0
Total full-time permanent (FTE)			(3)		(351,500)
2022 Pay Adjustment (2.7%)					0
					(351,500)

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	(3)
Total FTE	(3)
Authorized Positions:	
Full-time permanent	(3)
Total Positions	(3)

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Systems Acquisition
Subactivity: Low Earth Orbit (LEO) – Cooperative Data and Rescue Services (CDARS)

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Decrease from 2022 Base
11.1	Full-time permanent compensation	11,076	10,291	10,291	9,939	(352)
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	92	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	11,168	10,291	10,291	9,939	(352)
12	Civilian personnel benefits	3,554	3,306	3,306	3,193	(113)
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	176	248	248	248	0
22	Transportation of things	4	0	0	0	0
23	Rent, communications, and utilitites	0	1,230	1,230	1,230	0
23.1	Rental payments to GSA	1,165	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	103	0	0	0	0
24	Printing and reproduction	8	40	40	40	0
25.1	Advisory and assistance services	94,888	5,695	5,695	4,974	(721)
25.2	Other services from non-Federal sources	18,002	2,284	2,284	1,364	(920)
25.3	Other goods and services from Federal sources	589,653	638,626	638,626	627,632	(10,994)
25.4	Operation and maintenance of facilities	3,292	0	0	0	0
25.5	Research and development contracts	12,782	0	0	0	0
25.6	Medical care	73	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	197	111	111	111	0
31	Equipment	421	549	549	549	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	22,266	15,747	15,747	15,747	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	11	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	757,763	678,127	678,127	665,027	(13,100)

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(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Low Earth Orbit (LEO)	Pos./BA	95	678,127	95	680,335	0	2,208
	FTE/OBL	93	678,127	93	680,335	0	2,208

COSMIC-2/GNSS RO (+$2,208, 0 FTE/ 0 Positions) - NOAA requests an increase to maintain the current operational capability of the ground system for the COSMIC-2 program. Without the increase, NOAA will be forced to eliminate the quality assurance of the data and reduce the number of ground reception stations used to acquire data. Reducing the number of ground reception stations will increase latency of the delivery of the data to the user. When the data is delivered later than the required time, it is unable to be utilized by the NWS or USAF, which will have a negative impact on NOAA's forecast product accuracy.

This request aligns with the commitments outlined in the "Radio Occultation Data Gap Mitigation Plan" NOAA has developed pursuant to direction provided in Senate Report 115-275 and delivered on May 1, 2020.

NOAA's satellites collect essential data that serve as a long-term record for monitoring key climate parameters, and there is increasing demand for NOAA's satellite operations to collect more accurate information and expand observing capacity. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022 – FY 2026

- Reception and processing of equatorial low Earth orbit satellite RO data from COSMIC-2 mission
- Reception and processing of mid and high latitude low Earth orbit satellite RO data from partner missions

Deliverables:

- Processed RO data; improved quality control algorithms for GNSS RO data in NWS operational data assimilation systems

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(Dollar amounts in thousands)

- GNSS RO data for assimilation into the NWS predictive weather models

Performance Measures	2022	2023	2024	2025	2026
Percentage of data provided to NWS and USAF within required 35-minute average.					
With Increase	100%	100%	100%	100%	100%
Without Increase	85%	70%	50%	50%	50%
Outyear Costs:					
Direct Obligations	2,208	2,370	2,535	2,704	2,876
Capitalized	0	0	0	0	0
Uncapitalized	2,208	2,370	2,535	2,704	2,876
Budget Authority	2,208	2,370	2,535	2,704	2,876
Outlays	927	995	1,065	1,136	1,208
FTE	0	0	0	0	0
Positions	0	0	0	0	0

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Outyear Funding Estimates

LEO	2021 & Prior	2022	2023*	2024*	2025*	2026*	CTC	Total
Change from 2022 Base	N/A	2,208	2,370	2,535	2,704	2,876	TBD	TBD
Total COSMIC-2 / GNSS RO Request	51,025	8,100	8,262	8,427	8,596	8,768	TBD	TBD
Total Other LEO Programs (PAC)#	**12,638,253**	**504,630**	**494,656**	**496,353**	**496,380**	**518,407**	**TBD**	**TBD**
Total LEO Request (PAC)^^	**12,689,278**	**512,730**	**502,918**	**504,780**	**504,976**	**527,175**	**TBD**	**TBD**

* Outyears are estimates only. Future requests will be determined through the annual budget process.
# Total Other LEO Programs (PAC) includes PWS, LEO Weather Satellites, CDARS, and POES Extension PAC funding only.
^^ Total LEO Request includes PWS, LEO Weather Satellites, CDARS, COSMIC-2/GNSSRO, and POES Extension PAC funding only.

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Systems Acquisition
Subactivity: Low Earth Orbit (LEO) – COSMIC-2 / GNSS RO

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	11,076	10,291	10,291	10,291	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	92	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	11,168	10,291	10,291	10,291	0
12	Civilian personnel benefits	3,554	3,306	3,306	3,306	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	176	248	248	248	0
22	Transportation of things	4	0	0	0	0
23	Rent, communications, and utilitites	0	1,230	1,230	1,230	0
23.1	Rental payments to GSA	1,165	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	103	0	0	0	0
24	Printing and reproduction	8	40	40	40	0
25.1	Advisory and assistance services	94,888	5,695	5,695	5,695	0
25.2	Other services from non-Federal sources	18,002	2,284	2,284	2,284	0
25.3	Other goods and services from Federal sources	589,653	638,626	638,626	640,834	2,208
25.4	Operation and maintenance of facilities	3,292	0	0	0	0
25.5	Research and development contracts	12,782	0	0	0	0
25.6	Medical care	73	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	197	111	111	111	0
31	Equipment	421	549	549	549	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	22,266	15,747	15,747	15,747	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	11	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	757,763	678,127	678,127	680,335	2,208

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(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Low Earth Orbit (LEO)	Pos./BA	95	678,127	95	698,127	0	20,000
	FTE/OBL	93	678,127	93	698,127	0	20,000

Polar Operational Environmental Satellites (POES) Extension (+$20,000, 0 FTE/ 0 Positions) – NOAA proposes to extend operations of the POES satellites (NOAA-15, NOAA-18, and NOAA-19) which provide critical early-morning orbit observations.

The legacy POES satellites have drifted into the early morning orbit over time. While the POES satellites are beyond their design life, the spacecraft and many instruments and channels are operational and continue to provide critical data to numerical weather prediction (NWP) models and for situational nowcasting needs. NWP impact studies show statistically significant degradation in forecast models when POES satellite data is removed.

Extending POES will also provide continuity for the Argos-DCS Program, which provides relay of meteorological data from ocean buoys and wildlife monitoring. Following POES, the CDARS-ADCS sensor will support the Argos-DCS program after it is launched, completes calibration, and is placed into operations.

The legacy-based POES ground system consists of a command and control segment, processing, antenna equipment, and simulator utilizing a design that is currently more than 20 years old, with several components that have reached their end of life. This investment will extend the operation of the POES satellites through cost effective modifications to the ground system to ensure safe, secure operations. In parallel with this effort, NOAA's LEO Weather Satellite program is development replacement observations for the POES satellites (See the LEO Weather Satellites Program Increase request on NESDIS-115 for more detail).

The requested funding will support a combination of upgrades of the POES ground system and antennas, POES IT security accreditation and authorization, and studying the use of commercial service providers for operations, if available. Without a cost-effective approach for safe and secure mission operations, the POES satellites will be decommissioned by the mid-2020s.

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NOAA's satellites collect essential data that serve as a long-term record for monitoring key climate parameters, and there is increasing demand for NOAA's satellite operations to collect more accurate information and expand observing capacity. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022
- Ground system upgrades and maintenance
- Execute IT Security fixes, POA&M remediation
- Address SolarWinds vulnerability
- Remediate and address IT Security vulnerabilities
- Upgrade end of life support server, networking devices, equipment
- Upgrade end of life operations systems (Redhat 6, Windows 7, Windows 2012)
- Stand up active directory with windows 2016 and windows 10 desktop for centralized account management controls
- Upgrade hardware and software for product processing and distribution
- Fix POES backup system and demonstrate reconstitution plan for POES ground system
- Fix audit information system and process
- Continue operating POES satellites and providing environmental products

FY 2023
- Ground system upgrade
- IT Security fixes/upgrades and scanning/patching
- IT Security scanning and patching
- Polar products processing and distribution
- IT security authorization to operate (ATO)
- Ground system operations and maintenance
- Evaluation of the feasibility of operating POES satellites and providing environmental products for maximum duration of time.

Deliverables:
- Strategic tech refresh of the POES ground system

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Procurement, Acquisition, and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Percent of milestones completed					
With increase	75%	75%	0%	0%	0%
Without increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	20,000	10,000	0	0	0
Capitalized	20,000	10,000	0	0	0
Uncapitalized	0	0	0	0	0
Budget Authority	20,000	10,000	0	0	0
Outlays	8,400	4,200	0	0	0
FTE	0	0	0	0	0
Positions	0	0	0	0	0

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Outyear Funding Estimates*

LEO	2021 & Prior	2022*	2023*	2024*	2025*	2026*	CTC	Total
Change from 2022 Base	N/A	20,000	10,000	0	0	0	0	30,000
Total POES Extension	N/A	20,000	10,000	0	0	0	0	30,000
Total Other LEO Programs (PAC)#	**12,689,278**	**492,730**	**492,918**	**504,780**	**504,976**	**527,175**	**TBD**	**TBD**
Total LEO Request (PAC)^^	**12,689,278**	**512,730**	**502,918**	**504,780**	**504,976**	**527,175**	**TBD**	**TBD**

* Future requests will be determined on an annual basis.
# Total Other LEO Programs (PAC) includes PWS, LEO Weather Satellites, CDARS, and COSMIC-2/GNSSRO PAC funding only.
^^ Total LEO Request includes PWS, LEO Weather Satellites, CDARS, COSMIC-2/GNSSRO, and POES Extension PAC funding only.

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Systems Acquisition
Subactivity: Low Earth Orbit (LEO) – POES Extension

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	11,076	10,291	10,291	10,291	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	92	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	11,168	10,291	10,291	10,291	0
12	Civilian personnel benefits	3,554	3,306	3,306	3,306	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	176	248	248	248	0
22	Transportation of things	4	0	0	0	0
23	Rent, communications, and utilitites	0	1,230	1,230	1,230	0
23.1	Rental payments to GSA	1,165	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	103	0	0	0	0
24	Printing and reproduction	8	40	40	40	0
25.1	Advisory and assistance services	94,888	5,695	5,695	5,695	0
25.2	Other services from non-Federal sources	18,002	2,284	2,284	7,284	5,000
25.3	Other goods and services from Federal sources	589,653	638,626	638,626	653,626	15,000
25.4	Operation and maintenance of facilities	3,292	0	0	0	0
25.5	Research and development contracts	12,782	0	0	0	0
25.6	Medical care	73	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	197	111	111	111	0
31	Equipment	421	549	549	549	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	22,266	15,747	15,747	15,747	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	11	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	757,763	678,127	678,127	698,127	20,000

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Space Weather Observations (SWO)	Pos./BA	30	114,721	30	153,506	0	38,785
	FTE/OBL	28	114,721	28	153,506	0	38,785

Space Weather Follow On (+$38,785, 0 FTE/ 0 Positions) – NOAA requests a planned increase for the Space Weather Follow On (SWFO) program. Funding will support a SWFO-L1 mission with a Space Weather Instrument Suite (SWIS) for solar wind observations and a compact coronagraph (CCOR) for coronal mass ejection (CME) imagery at Lagrange point 1. The NOAA SWFO-L1 mission will ensure continuity of space weather data beyond NOAA's Deep Space Climate Observatory (DSCOVR) and NASA-European Space Agency research Solar and Heliospheric Observatory (SOHO), which are well past their design life. The funding also supports the integration of a CCOR on the GOES-U spacecraft. Flying a second CCOR in a geostationary orbit adds operational resilience and reliability to the CME imagery necessary for space weather warnings and forecasting.

The SWFO Program is being developed to take advantage of a rideshare launch opportunity with NASA's Interstellar Mapping and Acceleration Probe (IMAP) mission scheduled for FY 2025. Funding is essential to allow SWFO to maintain the schedule and milestones to meet the NASA IMAP rideshare. Leveraging the IMAP rideshare opportunity is the most timely and cost effective mechanism to ensure space weather forecasting continuity.

CME and solar wind measurements are necessary for NOAA to provide warnings for the two major types of space weather events that affect the Earth: solar radiation storms and geomagnetic storms. Satellites are mostly impacted by solar radiation storms. Commercial airlines are re-routed during both radiation and/or geomagnetic storms. These storms cause communication blackouts and impacts to navigation accuracy. The most extreme geomagnetic storms have resulted in severe impacts to commercial power grids and impacted hundreds of millions of people. Satellite data, including CME imagery and measurement of solar wind plasma, are critical to providing accurate and early warnings of these potentially destructive space weather events. Requirements for these measurements derive from the NOAA Space Weather Mission Service Area Observational User Requirements Document baselined

by the NOAA Observing System Council in November 2017.

NOAA's satellites collect essential data that serve as a long-term record for monitoring key climate parameters, and there is increasing demand for NOAA's satellite operations to collect more accurate information and expand observing capacity. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:

FY 2022
- SWFO Program Key Decision Point C: Proceed to Final Design & Fabrication (KDP-C)
- Compact Coronagraph integrated to GOES-U
- SWFO Program Critical Design Review
- Early release of command and control software

FY 2023
- Instruments ship to SWFO-L1 spacecraft
- SWFO Program Key Decision Point D: Proceed to System Assembly, Integration & Test, and Launch & Checkout (KDP-D)
- First release of command and control software
- First End-to-End Test with SWFO-L1 observatory
- SWFO Antenna Network Ready for Installation

FY 2024
- Ship SWFO-L1 spacecraft to IMAP launch vehicle for integration

FY 2025
- Rideshare launch of SWFO-L1 spacecraft with IMAP
- SWFO-L1 mission Initial Operational Capability

FY 2026
- SWFO-L1 mission Full Operational Capability

Deliverables
- Provide timely access to operational solar wind data and CME imagery for short and long-term warnings of geomagnetic storms

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Percentage of projected milestones to be completed annually to meet the LRD for SWFO-L1. This includes key decision points, major reviews, testing, and delivery of the following instruments: CCOR-1, SWiPS, MAG, and STIS					
With Increase	75%	75%	75%	75%	75%
Without Increase	20%	5%	0%	0%	0%
Outyear Costs:					
Direct Obligations	38,785	28,085	(10,915)	(66,915)	(85,815)
Capitalized	38,785	28,085	(10,915)	(66,915)	(85,815)
Uncapitalized	0	0	0	0	0
Budget Authority	38,785	28,085	(10,915)	(66,915)	(85,815)
Outlays	16,290	11,976	(4,584)	(28,104)	(36,042)
FTE	0	0	0	0	0
Positions	0	0	0	0	0

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Outyear Funding Estimates*

SWO	2021 & Prior	2022	2023*	2024*	2025*	2026*	CTC	Total
Change from 2022 Base	N/A	38,785	28,085	(10,915)	(66,915)	(85,815)	N/A	N/A
Total SWFO Request	213,815	146,900	136,200	97,200	41,200	22,300	35,185	692,800
Total Other SWO Programs^	N/A	61,606	151,606	156,606	158,706	206,606	TBD	TBD
Total SWO Request^^	213,815	208,506	287,806	253,806	199,906	228,906	TBD	TBD

* Outyears are estimates only. Future requests will be determined through the annual budget process and informed by the various studies as the program moves through the formulation gateways.
^ Total Other SWO Programs includes PPA Base and Space Weather Next.
^^Total SWO Request includes SWFO, PPA Base, and Space Weather Next.

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Systems Acquisition
Subactivity: Space Weather Observations (SWO) – Space Weather Follow On (SWFO)

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	3,648	4,430	4,430	4,430	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	57	67	67	67	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	3,705	4,497	4,497	4,497	0
12	Civilian personnel benefits	995	1,018	1,018	1,018	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	66	27	27	27	0
22	Transportation of things	0	0	0	0	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	840	893	893	893	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	26	34	34	34	0
24	Printing and reproduction	0	11	11	11	0
25.1	Advisory and assistance services	12,894	2,540	2,540	16,115	13,575
25.2	Other services from non-Federal sources	1,889	941	941	6,759	5,818
25.3	Other goods and services from Federal sources	65,101	103,767	103,767	123,160	19,393
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	1,282	193	193	193	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	63	13	13	13	0
31	Equipment	175	6	6	6	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	3,318	781	781	781	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	90,354	114,721	114,721	153,506	38,785

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(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Space Weather Observations (SWO)	Pos./BA	30	114,721	40	169,721	10	55,000
	FTE/OBL	28	114,721	36	169,721	8	55,000

Space Weather Next (+$55,000, 8 FTE/ 10 Positions) – NOAA proposes to initiate the Space Weather Next (SWNext) program that will sustain, improve, extend and mitigate potential gaps in observations to support NOAA space weather forecast operations as authorized by the PROSWIFT Act and driven by the National Space Weather Strategy and Action Plan. Without establishment of activities and projects to obtain these observations, NOAA will not be able to meet its strategic objectives and will jeopardize space weather forecasts affecting multiple sectors of the economy. This work is required to sustain continuity of the existing program of record observations and, together with research investments within NASA and operational product improvements within NOAA's National Weather Service. Space weather is critical to all space assets and the establishment of space commerce. Increasing the capability of predicting space weather events will directly support the protection of critical infrastructures which include commercial banking, electrical power grid, and airline operations.

The program will be responsible for formulation, development and deployment of NESDIS observational capabilities with respect to space weather. These program responsibilities and deliverables will include:

- Pre-formulation and formulation activities to establish and baseline a Space Weather Program. NESDIS will engage the space weather stakeholder community, industry, academia, interagency working groups, and advisory groups to define requirements. Concept designs, trade studies, and analysis of alternatives are necessary in preparation for Department of Commerce Milestones and NASA Key Decision Points. Initial projects will include an L1 continuity project and may include projects to sustain and extend observations from Low Earth Orbit (LEO), Geostationary Orbit (GEO), and other orbits as appropriate to meet the NOAA mission need in the most cost effective manner.
- Develop a Compact Coronagraph for deployment aboard the ESA Lagrange L5 mission that is anticipated to launch in 2027. This coronagraph will be constructed under interagency agreement with the Naval Research Laboratory and will improve near-real time coronal mass ejection imagery.

- Perform actions as detailed in the NOAA Space Weather Gap Mitigation plan including plans for contingency coronal imagery by exploiting observations from NOAA partners. Partner observations under consideration include coronagraph observations from the upcoming NASA PUNCH mission, solar wind data from the NASA IMAP mission, and other partner assets at L1 such as ISRO Aditya and NASA Solar Cruiser that may provide temporary and partial coverage.

As a result of the pre-formulation activities in FY2022, NOAA will prepare and deliver a comprehensive space weather program plan of execution that will identify the mission performance enabled by the five year profile for FY2023 through FY2026.

NOAA's satellites collect essential data that serve as a long-term record for monitoring key climate parameters, and there is increasing demand for NOAA's satellite operations to collect more accurate information and expand observing capacity. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:

FY 2022
- SWO Milestone 1/Key Decision point
- SWO Program System Requirements Review (SRR)
- SWO program Acquisition Strategy Meeting

FY 2023
- SWO Milestone 2/Key Decision Point 1 (Authority to Proceed for Program)
- SWO Mission Definition Review
- GEO project Milestone 1/Key Decision Point A
- L1 project Milestone 1/Key Decision Point A
- L1 project System Requirements Review

FY 2024
- GEO project System Requirements Review
- GEO project Milestone 2 Review
- GEO project System Definition Review

FY 2025
- GEO Project Key Decision Point B
- L1 project Milestone 2 Review
- L1 project System Definition Review

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

- L1 project Key Decision Point B

FY 2026

- GEO project Key Decision Point C
- L1 project Preliminary Design Review

Deliverables:

- Provide continuity of space weather ionosphere, thermosphere, solar and heliospheric observations to ensure accurate and timely alerts and warnings for the protection of critical infrastructures and societal and economic impacts due to space weather.

Performance Measures	2022	2023	2024	2025	2026
Description: Percentage of projected milestones to be completed annually for the Space Weather Next program. This includes key decision points and major reviews for the program.					
With Increase	75%	75%	75%	75%	75%
Without Increase	0%	0%	0%	0%	0%
Outyear Costs:					
Direct Obligations	55,000	145,000	150,000	152,100	200,000
Capitalized	55,000	145,000	150,000	152,100	200,000
Uncapitalized	0	0	0	0	0
Budget Authority	55,000	145,000	150,000	152,100	200,000
Outlays	23,100	60,900	63,000	63,882	84,000
FTE	8	TBD	TBD	TBD	TBD
Positions	10	TBD	TBD	TBD	TBD

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Outyear Funding Estimates*

SWO	2021 & Prior	2022	2023*	2024*	2025*	2026*	CTC	Total
Change from 2022 Base	N/A	55,000	145,000	150,000	152,100	200,000	TBD	TBD
Total SWNext Request	0	55,000	145,000	150,000	152,100	200,000	TBD	TBD
Total Other SWO Programs^	**N/A**	**153,506**	**142,806**	**103,806**	**47,806**	**28,906**	**TBD**	**TBD**
Total SWO Request^^	**N/A**	**208,506**	**287,806**	**253,806**	**199,906**	**228,906**	**TBD**	**TBD**

* Outyears are estimates. Future requests will be determined through the annual budget process and informed by the various studies as the program moves through the formulation gateways.
^ Total Other SWO Programs includes PPA Base and Space Weather Follow On.
^^Total SWO Request includes SWFO, PPA Base, and Space Weather Next.

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PROGRAM CHANGE PERSONNEL DETAIL
(Dollar amounts in thousands)

Activity: Systems Acquisition
Subactivity: Space Weather Observations (SWO) – Space Weather Next (SWNext)

Title		Grade	Number	Annual Salary	Total Salaries
Program Manager		ZP-V	1	154,687	154,687
Supervisory Engineer		ZP-V	1	156,700	156,700
General Engineer		ZP-IV	4	139,700	558,800
Physical Scientist		ZP-IV	3	141,000	423,000
Program Analyst		ZA-III	1	93,587	93,587
Total			10		1,386,774
Less lapse	25.00%		(2)		(346,694)
Total full-time permanent (FTE)			8		1,040,081
2022 Pay Adjustment (2.7%)					28,082
					1,068,163

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	8
Total FTE	8
Authorized Positions:	
Full-time permanent	10
Total Positions	10

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Systems Acquisition
Subactivity: Space Weather Observations (SWO) – Space Weather Next (SWNext)

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	3,648	4,430	4,430	5,498	1,068
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	57	67	67	67	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	3,705	4,497	4,497	5,565	1,068
12	Civilian personnel benefits	995	1,018	1,018	1,370	352
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	66	27	27	27	0
22	Transportation of things	0	0	0	0	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	840	893	893	893	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	26	34	34	34	0
24	Printing and reproduction	0	11	11	11	0
25.1	Advisory and assistance services	12,894	2,540	2,540	18,621	16,081
25.2	Other services from non-Federal sources	1,889	941	941	8,982	8,041
25.3	Other goods and services from Federal sources	65,101	103,767	103,767	133,225	29,458
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	1,282	193	193	193	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	63	13	13	13	0
31	Equipment	175	6	6	6	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	3,318	781	781	781	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	90,354	114,721	114,721	169,721	55,000

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Common Ground Services (CGS)	Pos./BA	35	48,626	35	73,633	0	25,007
	FTE/OBL	34	48,626	34	73,633	0	25,007

Data-Source Agnostic Common Services (DACS) (+$25,007, 0 FTE/ 0 Positions) – NOAA requests an increase to expand leveraging of non-NOAA and commercial data sources and to provide the IT infrastructure to securely ingest, generate science products, distribute, and archive data. With this increase in funding, NOAA will complete an end-to-end infrastructure that will allow us to leverage partner and commercial observations to meet NOAA's and NESDIS' mission requirements in a cost-effective manner, and to begin delivering enhanced products and services to meet NOAA's environmental and climate mission.

The $5.0 million investment in FY 2021 initiated activities to establish the NESDIS Common Cloud Framework (NCCF). In FY 2021 NOAA operationalized the secure ingest and product generation functionalities within the NCCF to support ingest and processing of non-NOAA and commercial radio occultation (RO) data. The FY 2022 investment will complete the infrastructure framework by adding the distribution and archive functionalities, and will continue the migration of on-premises IT systems and environmental holdings to the cloud. The investment will also generate products to support multiple NOAA mission service areas such as weather forecasting, ocean prediction, and ecosystem monitoring. Partner satellite missions provide key observations from sensors not flown by NOAA. NOAA partners invest more than $2 billion-a-year in space segments, which provides NOAA an opportunity to leverage these investments to generate products and services that meet NOAA mission requirements.

Without this investment NOAA will not be able to accelerate NCCF implementation quickly enough to accommodate the significant increase in volume and diversity of observations from partner missions, impacting NOAA's ability to: evolve numerical weather prediction; support healthy, productive and resilient ocean ecosystems; and predict severe weather. Additionally, NOAA will continue to operate older on-premise systems and maintain its vast environmental holdings in disparate IT systems. Continued reliance on these legacy systems will increase NOAA's systems risk, as the technology ages.

Consolidating NOAA's data in the NCCF will significantly enhance access to, and usability of NOAA's data, which is expected to grow from 40 to 400 petabytes by 2030. This will enable NOAA and other users to quickly develop new applications, facilitate research by

the academic community and facilitate the use of artificial intelligence and machine learning to exploit big data sets. Additionally, the DACS initiative also supports the Administration's Executive Order on Climate by maintaining and archiving long term climate records, and supporting the ingest and archive of new observations for monitoring climate change.

NOAA's satellites collect essential data that serve as a long-term record for monitoring key climate parameters, and there is increasing demand for NOAA's satellite operations to collect more accurate information and expand observing capacity. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:

FY 2022

- Complete end-to-end architecture to allow secure ingest, product generation, data distribution, and archive in the cloud
- Generate cloud enabled products from external data sources (e.g., MeteoSat Third Generation (MTG), Radarsat Constellation Mission (RCM) 1/2/3, Sentinel-6, and OceanSat)
- Transition products from existing (legacy) sources to NCCF and decommission legacy processing components
- Continue migrating environmental data holdings to the NCCF
- Optimize cloud architecture to reduce research to operations timelines
- Optimize satellite and climate products running in the cloud

FY 2023

- Complete migration of on-premise enterprise product generation system to the NCCF and decommission legacy systems
- Generation and operationalize cloud enabled products from external data sources (e.g., MTG, ALOS-4, GOSAT-GW)
- Continue migration of archived environmental data holdings to the NCCF
- Begin migration of science sandbox environment to support algorithm development activities to the NCCF
- Continue to optimize the cloud architecture to reduce product development and deployment timelines

FY 2024 - FY 2026

- Complete migration of on-premise archive systems to the NCCF and decommission legacy systems
- Continue to expand cloud enabled products from additional data sources
- Maintain the cloud-enabled framework functionality (ingest, generation, distribution, archive)
- Continue to optimize the cloud architecture to reduce product development and deployment timelines
- Continue to migration of algorithm development activities to the NCCF

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(Dollar amounts in thousands)

Deliverables:

- End to end cloud framework architecture to allow ingest, product generation, data distribution, and archive in the cloud
- Ingest, product generation, and archive of data from partner sources per enterprise Cloud Roadmap

Outyear Funding Estimates*

CGS (DACS)	2021 & Prior**	2022	2023	2024	2025	2026	CTC	Total
Change from 2022 Base	N/A	25,007	25,007	40,485	40,485	40,485	N/A	N/A
Total DACS Request	5,015	30,022	30,022	45,500	45,500	45,500	N/A	N/A
Total CGS Request	39,287	73,633	73,633	89,111	89,111	89,111	N/A	N/A

* Outyears are estimates only. Future requests will be determined through the annual budget process.
** DACS was established in FY 2021, so the 2021 & Prior column does not reflect any funding prior to FY 2021.

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Performance Measures[7]	2022	2023	2024	2025	2026
Enhanced or new products and services made available to the designated user community which utilize partner data sources based on NESDIS core mission data product categories.					
With Increase	18	28	20	26	18
Without Increase	7	4	6	5	6
Outyear Costs:					
Direct Obligations	25,007	25,007	40,485	40,485	40,485
Capitalized	0	0	0	0	0
Uncapitalized	25,007	25,007	40,485	40,485	40,485
Budget Authority	25,007	25,007	40,485	40,485	40,485
Outlays	10,503	10,503	17,004	17,004	17,004
FTE	0	0	0	0	0
Positions	0	0	0	0	0

[7] As science products fluctuate, the years there is less product development, the program will increase technology capabilities and capacity to maintain alignment with future needs. Data product performance measures are derived from known requirements from satellite partners.

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Activity: Systems Acquisition
Subactivity: Common Ground Services (CGS) – Data-Source Agnostic Common Services (DACS)

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	5,821	6,915	6,915	6,915	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	100	0	0	0	0
11.7	NOAA Corps	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	5,921	6,915	6,915	6,915	0
12	Civilian personnel benefits	1,902	1,951	1,951	1,951	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	44	76	76	76	0
22	Transportation of things	1	6	6	6	0
23.1	Rental payments to GSA	508	548	548	548	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	33	0	0	500	500
24	Printing and reproduction	0	1	1	1	0
25.1	Advisory and assistance services	10,368	12,030	16,759	16,759	0
25.2	Other services from non-Federal sources	19,710	14,490	15,711	34,443	18,732
25.3	Other goods and services from Federal sources	8,742	0	2,089	5,114	3,025
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	2,618	2,000	3,300	3,300	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	384	11	11	261	250
31	Equipment	865	1,143	1,143	3,643	2,500
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	1,511	116	116	116	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	2	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	52,608	39,287	48,626	73,633	25,007

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		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Systems/Services Architecture & Engineering (SAE)	Pos./BA	29	38,500	29	43,500	0	5,000
	FTE/OBL	27	38,500	27	43,500	0	5,000

Commercial Weather Data Pilot (CWDP) (+$5,000, 0 FTE/ 0 Positions) – NOAA requests a planned increase to continue executing pilots on emerging commercial data capabilities. These pilots assess operational viability of possible future commercial capabilities, which is critical to planning for NOAA's future satellite architecture needs. Pilot work allows NOAA to sample and analyze prospective data before purchase from various commercial vendors, explore the utility and quality of new data types when they become available, and leverage industry investment in emerging commercial capabilities that could contribute to NOAA's mission in the future. CWDP will base ongoing pilots on the outcomes of regularly released Requests for Information (RFI), which focus on commercially available data that may improve numerical weather prediction, consistent with direction in the *Weather Research and Forecasting Innovation Act of 2017* (P.L. 115-25), and on continued regular canvassing of emerging commercial sector capabilities, consistent with the NOAA Commercial Space Policy. Results from an RFI released in September 2020 showed that there are data types beyond Global Navigation Satellite System (GNSS) Radio Occultation (RO) ready for piloting (e.g. microwave, GNSS reflectometry), which indicates a need to initiate CWDP Round 3 in FY 2022.

NOAA's satellites collect essential data that serve as a long-term record for monitoring key climate parameters, and there is increasing demand for NOAA's satellite operations to collect more accurate information and expand observing capacity. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022
- Award contract(s) to one or more companies to purchase commercial pilot data
- Initiate CWDP Round 3 data/capability assessment, pending contract award
- Explore additional sources/types of data and capabilities available from the commercial sector through market research

FY 2023

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- Complete the assessment phase of CWDP Round 3
- Develop findings on the results of CWDP Round 3
- Initiate CWDP Round 4, pending commercial sector readiness
- Explore additional sources/types of data and capabilities available from the commercial sector through market research

FY 2024 – FY 2026

- Conduct the assessment of CWDP Round 4 data/capability, pending contract award
- Complete the assessment phase of CWDP Round 4
- Develop findings on the results of CWDP Round 4
- Explore additional sources/types of data and capabilities available from the commercial sector through market research
- Initiate additional CWDP Rounds, pending commercial sector readiness

Deliverables:

- Results of ongoing market research
- Results of evaluations regarding new data and capabilities
- Operational services contracts with commercial providers, pending pilot results

Performance Measures	2022	2023	2024	2025	2026
Number of calls and contracts for commercial data and services issued to industry					
With Increase	2	1	2	1	2
Without Increase	1	1	1	1	1
Outyear Costs:					
Direct Obligations	5,000	5,000	5,000	5,000	5,000
Capitalized	0	0	0	0	0
Uncapitalized	5,000	5,000	5,000	5,000	5,000
Budget Authority	5,000	5,000	5,000	5,000	5,000
Outlays	2,100	2,100	2,100	2,100	2,100
FTE	0	0	0	0	0

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Positions	0	0	0	0	0

Outyear Funding Estimates*

SAE (CWDP)	2021 & Prior**	2022	2023	2024	2025	2026	CTC	Total
Change from 2022 Base	N/A	5,000	5,000	5,000	5,000	5,000	N/A	N/A
Total CWDP Request	6,000	8,000	8,000	8,000	8,000	8,000	N/A	N/A
Total other SAE Programs^	66,490	73,500	66,500	69,500	72,500	72,500	N/A	N/A
Total SAE Request	72,490	81,500	74,500	77,500	80,500	80,500	N/A	N/A

* Outyears are estimates. Future requests will be determined through the annual budget process.
** SAE was established in FY 2020; 2021 & Prior column does not reflect any funding prior to FY 2020.
^ Total other SAE Programs includes Architecture, Requirements, and Planning; Commercial Data Purchase; and Joint Venture. The funding profile includes other requested program increases on NESDIS-156 and NESDIS-161.

Exhibit 15

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Procurement, Acquisition, and Construction
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Systems Acquisition
Subactivity: Systems/Services Architecture & Engineering – Commercial Weather Data Pilot (CWDP)

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	2,665	4,920	4,920	4,920	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	30	30	30	30	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	2,695	4,950	4,950	4,950	0
12	Civilian personnel benefits	875	1,189	1,189	1,189	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	45	90	90	90	0
22	Transportation of things	0	0	0	0	0
23	Rent, communications, and utilitites	0	483	483	483	0
23.1	Rental payments to GSA	228	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	19	0	0	0	0
24	Printing and reproduction	0	1	1	1	0
25.1	Advisory and assistance services	22,034	24,833	24,833	24,833	0
25.2	Other services from non-Federal sources	1,739	2,350	2,350	7,350	5,000
25.3	Other goods and services from Federal sources	1,936	3,023	3,023	3,023	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	569	1,200	1,200	1,200	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	14	52	52	52	0
31	Equipment	5	30	30	30	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	300	300	300	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	30,159	38,500	38,500	43,500	5,000

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(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Systems/Services Architecture & Engineering (SAE)	Pos./BA	29	38,500	30	51,500	1	13,000
	FTE/OBL	27	38,500	28	51,500	1	13,000

Commercial Data Purchase (+$13,000, 1 FTE/ 1 Positions) – NOAA requests a planned increase to purchase commercial GNSS-RO data for operational use. It will also support continued development and sustainment of the infrastructure and capability to securely import, transfer, process, and store external data from commercial providers for operational use.

Between 2016 and 2020, NESDIS conducted two rounds of the Commercial Weather Data Pilots (CWDP), which focused on evaluating GNSS RO data. These pilots demonstrated the commercial sector readiness, cost-effectiveness, and operational viability, for NOAA to initiate operational data purchases of GNSS RO data to include in NOAA's numerical weather prediction models. This approach is consistent with the *Weather Research and Forecasting Innovation Act of 2017* (P.L. 115-25), and NOAA's plans for obtaining GNSS RO data from a combination of government assets, partner contributions, and commercial purchases. In FY 2021, NOAA awarded its first contracts to purchase commercially available GNSS RO data for use in NOAA's operational weather forecasts. NOAA began using this commercial RO data in operational numerical weather prediction models in May 2021. In 2021 and through FY 2022 NOAA will be conducting ongoing cost-benefit analyses to determine the most appropriate amount of GNSS RO data to be purchased in future years. The amount of data purchased will depend on this cost-benefit evaluation, as well as the price, quality, and availability of data from commercial providers. These factors will also impact how quickly future data purchases will occur. NOAA plans to conduct additional commercial data pilot projects in FY 2022 and will increase operational investments in commercial data following a successful pilot phase. NOAA will also support subsequent operational data purchases of GNSS RO and other types of commercial data in the future.

NOAA's satellites collect essential data that serve as a long-term record for monitoring key climate parameters, and there is increasing demand for NOAA's satellite operations to collect more accurate information and expand observing capacity. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting

for the American public.

Schedule and Milestones:

FY 2022

- Continue to purchase GNSS RO data under 2020-2022 Indefinite Delivery Indefinite Quantity (IDIQ) contracts, pending commercial sector offerings
- Release a multi-year solicitation to increase operational investments in commercial GNSS RO data following initial 2020-2022 IDIQ contracts, pending commercial sector offerings

FY 2023

- Award multi-year contract(s) for commercial GNSS RO data

FY 2024 – FY 2026

- Release solicitation for commercial data types beyond GNSS RO data, pending results of CWDP Round 3
- Award contracts for additional commercial data types, pending commercial sector offerings
- Initiate additional solicitations to purchase available data that meets NESDIS requirements from the commercial market, if other types of on-orbit data are successfully piloted during this timeframe

Deliverables:

- Commercial GNSS RO data included with other satellite data delivered to the NWS for use in operational numerical weather prediction models

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(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of contracts in place for purchase of commercial data (cumulative)*					
With Increase	2	2	2	4	4
Without Increase	2	2	2	3	3
Outyear Costs:					
Direct Obligations	13,000	16,000	19,000	22,000	22,000
Capitalized	0	0	0	0	0
Uncapitalized	13,000	16,000	19,000	22,000	22,000
Budget Authority	13,000	16,000	19,000	22,000	22,000
Outlays	5,460	6,720	7,980	9,240	9,240
FTE	1	1	1	1	1
Positions	1	1	1	1	1

Outyear Funding Estimates*

SAE (Commercial Data Purchase)	2021 & Prior**	2022	2023	2024	2025	2026	CTC	Total
Change from 2022 Base	N/A	13,000	16,000	19,000	22,000	22,000	N/A	N/A
Total Commercial Data Purchase Request	14,000	22,000	25,000	28,000	31,000	31,000	N/A	N/A
Total other SAE Programs^	58,490	59,500	49,500	49,500	49,500	49,500	N/A	N/A
Total SAE Request	72,490	81,500	74,500	77,500	80,500	80,500	N/A	N/A

* Outyears are estimates. Future requests will be determined through the annual budget process.
** SAE was established in FY 2020; 2021 & Prior column does not reflect any funding prior to FY 2020.
^ Total other SAE Programs includes Architecture, Requirements, and Planning; Commercial Weather Data Pilot; and Joint Venture. The funding profile includes other requested program increases on NESDIS-152 and NESDIS-161.

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PROGRAM CHANGE PERSONNEL DETAIL
(Dollar amounts in thousands)

Activity: Systems Acquisition
Subactivity: Systems/Services Architecture & Engineering – Commercial Data Purchase

Title		Grade	Number	Annual Salary	Total Salaries
General Engineer		ZP-V	1	167,900	167,900
Total			1		167,900
Less lapse	25.00%		(0)		(41,975)
Total full-time permanent (FTE)			1		125,925
2022 Pay Adjustment (2.7%)					3,400
					129,325

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	1
Total FTE	1
Authorized Positions:	
Full-time permanent	1
Total Positions	1

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Systems Acquisition
Subactivity: Systems/Services Architecture & Engineering (SAE) – Commercial Data Purchase

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	2,665	4,920	5,116	5,245	129
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	30	30	29	29	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	2,695	4,950	5,146	5,275	129
12	Civilian personnel benefits	875	1,189	1,573	1,614	41
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	45	90	240	240	0
22	Transportation of things	0	0	0	0	0
23	Rent, communications, and utilitites	0	483	0	0	0
23.1	Rental payments to GSA	228	0	544	544	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	19	0	50	50	0
24	Printing and reproduction	0	1	4	4	0
25.1	Advisory and assistance services	22,034	31,407	8,979	8,979	0
25.2	Other services from non-Federal sources	1,739	0	10,016	22,846	12,830
25.3	Other goods and services from Federal sources	1,936	0	5,442	5,442	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	569	0	2,480	2,480	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	14	52	22	22	0
31	Equipment	5	30	18	18	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	300	3,987	3,987	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	30,159	38,500	38,500	51,500	13,000

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		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Systems/Services Architecture, and Engineering (SAE)	Pos./BA	29	38,500	30	63,500	1	25,000
	FTE/OBL	27	38,500	28	63,500	1	25,000

Joint Venture Partnerships (+$25,000, 1 FTE/ 1 Positions) – NOAA requests an increase to expand activities with other agencies and the commercial sector that investigate, mature, and demonstrate new technologies and capabilities that could potentially be incorporated into NOAA satellite architectures and associated enterprise products and services portfolios. New technologies and capabilities will focus heavily on innovations for LEO and SWO instruments to reduce cost and/or observing system complexity, and LEO spacecraft development and satellite operations. These efforts will increase both the efficacy and efficiency of NOAA's satellite fleet for the future.

With this request NOAA will 1) expand partnerships to leverage ongoing industry and agency development of new technology, observation capabilities, spacecraft and ground system design, information processing techniques, product evaluation and development, and tools for operational exploitation, and 2) leverage NASA and other agencies' Announcements of Opportunity to fund operational evaluations and/or demonstrations of other agency missions that demonstrate new observations and new technologies, or through research opportunities which demonstrate new ways to exploit existing and new data sources. These activities -- building on the FY 2020 and FY 2021 studies which partnered with the commercial sector and NASA to explore capabilities that could be developed and demonstrated in FY 2022 and beyond -- will help NOAA, jointly with partner agencies, fully develop and demonstrate both new observation capabilities and better methods to exploit existing satellite observations that will help increase skill for numerical weather and environmental prediction models.

Joint Venture activities will be conducted on an ongoing basis to enable NOAA to continually feed a more flexible architecture and a more responsive and capable product and services suite with the best emerging capabilities, technology innovation, scientific assessment, and enhanced mission concepts. In FY 2022, NOAA will enter into agreements with other Federal agencies, industry, or academia for detailed studies of instrument or other component concepts needed for the first LEO Weather Satellite demonstration and/or next generation Space Weather mission needs. Agreements will be based on findings from the Broad Agency

Announcements (BAA) concept studies executed under Joint Venture in FY 2020 – 2021.

The FY 2022 requests for Joint Venture, LEO, and SWO are complementary. Joint Venture is intended to invest in individual satellite or technology partnerships to demonstrate the viability of a measurement or spacecraft approach, while LEO is to invest in constellation and production developments and studies to understand the LEO and SWO system observations approach.

NOAA's satellites collect essential data that serve as a long-term record for monitoring key climate parameters, and there is increasing demand for NOAA's satellite operations to collect more accurate information and expand observing capacity. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:

FY 2022

- Initiate up to two data exploitation studies to assess non-NOAA observation capabilities for incorporation into NOAA operations and recommend if data from the assessed capability should be incorporated into NOAA operations
- Enter into agreements with other Federal agencies, industry, or academia for studies of instrument or other component concepts to evaluate new technologies to support the first LEO Weather Satellite demonstration and/or Space Weather mission needs
- Contribute funding with other agencies and industry toward data and technology development to cost effectively meet NOAA needs

FY 2023

- Start project initiation and approval to incorporate two non-NOAA data sources into NOAA operations, pending assessment in FY 2022
- Continue contracts with industry or academia on studies of instrument or other component concepts to evaluate new technologies to support the first LEO Weather Satellite demonstration or next generation Space Weather mission needs
- Contribute to studies with other agencies and industry toward data and technology development to cost effectively meet NOAA needs

FY 2024 - FY 2026

- Issue additional solicitations to industry or academia for priority next generation observational needs and award contracts based on proposals received
- Continue data exploitation studies as other agency observation capabilities become available for assessment of potential to

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incorporate into NOAA operations
- Continue assessing opportunities to partner with other agencies for future missions or research opportunities, contributing funding to address NOAA mission needs as part of relevant Announcements of Opportunity
- Continue to initiate future infrastructures and product developments for existing or new observation capabilities

Deliverables:
- Solicitations to industry in support of future LEO sounding architecture
- Awards to industry or academia for studies of instrument or other component concepts for first LEO Weather Satellite demonstration and/or Space Weather mission needs
- Development and demonstration of evolving capabilities for NOAA's operational use, including new observations and/or technologies that will inform NESDIS' future space architecture and suite of products
- Faster transition of research capabilities into operational use, and at a lower cost

Performance Measures	2022	2023	2024	2025	2026
Evaluation of new technology or data sources to meet NOAA needs					
With Increase	3	3	3	3	4
Without Increase	1	1	1	1	1
Outyear Costs:					
Direct Obligations	25,000	15,000	15,000	15,000	15,000
Capitalized	0	0	0	0	0
Uncapitalized	25,000	15,000	15,000	15,000	15,000
Budget Authority	25,000	15,000	15,000	15,000	15,000
Outlays	10,500	6,300	6,300	6,300	6,300
FTE	1	1	1	1	1
Positions	1	1	1	1	1

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(Dollar amounts in thousands)

Outyear Funding Estimates*

SAE (Joint Venture)	2021 & Prior**	2022	2023	2024	2025	2026	CTC	Total
Change from 2022 Base	N/A	25,000	15,000	15,000	15,000	15,000	N/A	N/A
Total Joint Venture Request	7,268	30,000	20,000	20,000	20,000	20,000	N/A	N/A
Total other SAE Programs^	65,222	51,500	54,500	57,500	60,500	60,500	N/A	N/A
Total SAE Request	72,490	81,500	74,500	77,500	80,500	80,500	N/A	N/A

* Outyears are estimates. Future requests will be determined through the annual budget process.
** SAE was established in FY 2020; 2021 & Prior column does not reflect any funding prior to FY 2020.
^Total other SAE Programs includes Architecture, Requirements, and Planning; Commercial Weather Data Pilot; and Commercial Data Purchase. The funding profile includes other requested program increases on NESDIS-152 and NESDIS-156.

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PROGRAM CHANGE PERSONNEL DETAIL
(Dollar amounts in thousands)

Activity: Systems Acquisition
Subactivity: Systems/Services Architecture, and Engineering (SAE) – Joint Venture Partnerships

Title		Grade	Number	Annual Salary	Total Salaries
General Engineer		ZP-V	1	167,900	167,900
Total			1		167,900
Less lapse	25.00%		(0)		(41,975)
Total full-time permanent (FTE)			1		125,925
2022 Pay Adjustment (2.7%)					3,400
					129,325

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	1
Total FTE	1
Authorized Positions:	
Full-time permanent	1
Total Positions	1

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Systems Acquisition
Subactivity: Systems/Services Architecture, and Engineering (SAE) – Joint Venture Partnerships

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	2,665	4,920	4,920	5,049	129
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	30	30	30	30	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	2,695	4,950	4,950	5,079	129
12	Civilian personnel benefits	875	1,189	1,189	1,230	41
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	45	90	90	90	0
22	Transportation of things	0	0	0	0	0
23	Rent, communications, and utilitites	0	483	483	483	0
23.1	Rental payments to GSA	228	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	19	0	0	0	0
24	Printing and reproduction	0	1	1	1	0
25.1	Advisory and assistance services	22,034	24,833	24,833	24,833	0
25.2	Other services from non-Federal sources	1,739	2,350	2,350	14,763	12,413
25.3	Other goods and services from Federal sources	1,936	3,023	3,023	15,440	12,417
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	569	1,200	1,200	1,200	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	14	52	52	52	0
31	Equipment	5	30	30	30	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	300	300	300	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	30,159	38,500	38,500	63,500	25,000

Exhibit 3

Department of Commerce
National Oceanic and Atmospheric Administration
Mission Support
Budget Estimates, Fiscal Year 2022

Executive Summary

For FY 2022, NOAA requests a total of $450,718,000 and 802 FTE/ 857 positions for Mission Support, including an increase of $92,900,000 and 62 FTE/ 79 positions in program changes.

In FY 2022, Mission Support will continue to provide the services that are essential to the safe and successful execution of NOAA's Mission.

The Mission Support budget is organized into six activities within the Operations, Research, and Facilities (ORF) account.

- Executive Leadership provides centralized executive management as well as policy formulation and direction.
- Mission Services and Management includes such activities as financial reporting, budgeting, information technology, acquisition and grants, human resource services, and facilities management.
- IT Security leads priority cyber security initiatives.
- Payment to the DOC Working Capital Fund provides centralized services to NOAA's Line Offices and Staff Offices.
- Office of Education provides expert support of education activities to NOAA Line, Program, and Staff Offices while promoting NOAA services and products and their benefits to the public.
- Facilities Maintenance supports a centralized approach to addressing facilities maintenance and repair projects across NOAA.

The Mission Support budget is organized under one activity within the Procurement, Acquisition, and Construction (PAC) account: NOAA Construction provides for restoration of capital assets including alteration or modification of properties.

Significant Adjustments:

Inflationary Adjustments
NOAA's FY 2022 Base includes a net increase of $13,030,000 and 0 FTE/ 0 positions to account for the full funding requirement for certain inflationary adjustments to current programs for Mission Support activities. This includes the estimated 2022 civilian pay raise of 2.7 percent and military pay raise of 2.7 percent, as well as inflationary increases for labor and non-labor activities including benefits and rent charges from the General Services Administration (GSA).

Department of Commerce
National Oceanic and Atmospheric Administration
Mission Support
Budget Estimates, Fiscal Year 2022

Technical Adjustments
NOAA requests the following transfers for a net change of -$396,000 and 0 FTE / 0 positions to the agency:

From Office	Subactivity	To Office	Subactivity	Amount
MS	Mission Services and Management (ORF)	OMAO	NOAA Commissioned Officer Corps (ORF)	$661,000 / 4 FTE / 4 positions

NOAA requests to transfer $661,000 and 4 FTE/4 Positions to the OMAO NOAA Commissioned Officer Corps PPA to allow for better alignment of funding and greater transparency over the full cost of the NOAA Corps. With this transfer, funding for all NOAA Corps personnel will reside within OMAO. This increases efficiency within the program by reducing administrative burdens and allows NOAA to better manage personnel requirements consistent with the NOAA Corps Amendments Act of 2020.

From Office	Subactivity	To Office	Subactivity	Amount
MS	Payment to the DOC Working Capital Fund (ORF)	MS	Mission Services and Management	$3,071,000/ 0 FTE / 0 positions

NOAA requests to transfer $3,071,000 and 0 FTE/0 Positions from the Payment to the DOC Working Capital Fund to Mission Services and Management to continue funding centralized services from the Department. “The Departmental Management Working Capital Fund management team and the Enterprise Services management team moved two projects from the Working Capital Fund (WCF) to the Advances and Reimbursements (A&R) account in FY 2021 as the accounts are direct licensing pass-throughs and more appropriate in the A&R account. These two accounts are the Enterprise Services HR Connect licenses and the Enterprise Services Commerce Learning Center licenses. The change was budget neutral for all Bureaus, but for NOAA represented a change across PPAs.

From Office	Subactivity	To Office	Subactivity	Amount
MS	Payment to the DOC Working Capital Fund (ORF)	DOC	Departmental Management	$396,228 / 0 FTE / 0 positions

The Department of Commerce (DOC) is proposing to transfer two projects and funding out of the WCF and the A&R account to the Departmental Management Salaries and Expense account as part of its annual review to properly align and account programs and

costs. This transfer executes NOAA portion of the DOC transfer. For more information regarding the specific projects and funding transfers for the Department of Commerce please refer to Exhibit 3 of the Departmental Management FY 2022 PB Submission.

Department of Commerce Enterprise Services Initiative:
Department of Commerce's leadership established the Enterprise Services Office to improve customer service and enhance the delivery of the Human Resources (HR), Acquisition Services, Financial Management and Information Technology functional areas with HR being the first functional area to transition to the Enterprise Services model. In late FY 2016, NOAA began a transition to an Enterprise Services model in concert with the Department to streamline the delivery of HR services. This new delivery model and approach has outsourced many HR clerical and transactional tasks, such as Personnel Action Requests, pay, separations, compensation and benefits. In FY 2021, ESO intends to develop additional HR services for recruiting and hiring (also identified as talent acquisition). NOAA is participating in this development and will use those results to influence its decisions affecting human capital services going forward. In FY 2022, the Office of Human Capital Services (OHCS) will continue to provide NOAA with expert consultative services in the areas of executive resources management, labor and employee relations, administrative investigations, quality assurance, program performance, detailed HR data modeling and analytics, employee and labor relations, retirement counseling and benefits, and personnel mentoring. OHCS will also institutionalize its talent acquisition approaches and mature its capabilities to understand future workforce needs, predict skills and talents needed, and develop and implement programs and approaches to address potential risks to achieving a balanced, diverse and modern workforce. As a result, OHCS will focus its efforts on implementing advanced strategic solutions that strengthen mission delivery and improve overall customer service.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
TRANSFER CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Mission Services and Management
Subactivity: Mission Services and Management (ORF) transfer to OMAO NOAA Commissioned Officer Corps (ORF)

	Object Class	2021 Enacted	2022 Transfer	2022 Base
11.1	Full-time permanent compensation	69,441	0	70,990
11.3	Other than full-time permanent	338	0	338
11.5	Other personnel compensation	1,945	0	1,944
11.7	NOAA Corps	661	(661)	0
11.9	Total personnel compensation	72,385	(661)	73,272
12	Civilian personnel benefits	22,923	0	25,421
13	Benefits for former personnel	52	0	52
21	Travel and transportation of persons	459	0	459
22	Transportation of things	145	0	149
23	Rent, communications, and utilitites	0	0	0
23.1	Rental payments to GSA	5,716	0	5,749
23.2	Rental Payments to others	666	0	666
23.3	Communications, utilities and misc charges	907	0	1,407
24	Printing and reproduction	370	0	376
25.1	Advisory and assistance services	18,691	0	18,791
25.2	Other services from non-Federal sources	17,698	0	18,918
25.3	Other goods and services from Federal sources	10,914	0	14,018
25.4	Operation and maintenance of facilities	0	0	0
25.5	Research and development contracts	0	0	0
25.6	Medical care	0	0	0
25.7	Operation and maintenance of equipment	0	0	0
25.8	Subsistence and support of persons	0	0	0
26	Supplies and materials	540	0	553
31	Equipment	1,186	0	1,207
32	Lands and structures	0	0	0
33	Investments and loans	0	0	0
41	Grants, subsidies and contributions	87	0	87
42	Insurance claims and indemnities	0	0	0
43	Interest and dividends	16	0	16
44	Refunds	0	0	0
99	Total obligations	152,755	(661)	161,141

*The 2022 Base column reflects the full 2022 Base for this Subactivity, including calculated ATBs and any additional transfers.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
TRANSFER CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Payment to the DOC Working Capital Fund
Subactivity: Payment to the DOC Working Capital Fund (ORF) transfer to Mission Services and Management (ORF)

	Object Class	2021 Enacted	2022 Transfer	2022 Base
11.1	Full-time permanent compensation	0	0	0
11.3	Other than full-time permanent	0	0	0
11.5	Other personnel compensation	0	0	0
11.7	NOAA Corps	0	0	0
11.9	Total personnel compensation	0	0	0
12	Civilian personnel benefits	0	0	0
13	Benefits for former personnel	0	0	0
21	Travel and transportation of persons	0	0	0
22	Transportation of things	0	0	0
23	Rent, communications, and utilitites	0	0	0
23.1	Rental payments to GSA	0	0	0
23.2	Rental Payments to others	0	0	0
23.3	Communications, utilities and misc charges	0	0	0
24	Printing and reproduction	0	0	0
25.1	Advisory and assistance services	0	0	0
25.2	Other services from non-Federal sources	0	0	0
25.3	Other goods and services from Federal sources	66,389	(3,071)	69,817
25.4	Operation and maintenance of facilities	0	0	0
25.5	Research and development contracts	0	0	0
25.6	Medical care	0	0	0
25.7	Operation and maintenance of equipment	0	0	0
25.8	Subsistence and support of persons	0	0	0
26	Supplies and materials	0	0	0
31	Equipment	0	0	0
32	Lands and structures	0	0	0
33	Investments and loans	0	0	0
41	Grants, subsidies and contributions	0	0	0
42	Insurance claims and indemnities	0	0	0
43	Interest and dividends	0	0	0
44	Refunds	0	0	0
99	Total obligations	66,389	(3,071)	69,817

*The 2022 Base column reflects the full 2022 Base for this Subactivity, including calculated ATBs and any additional transfers.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
TRANSFER CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Mission Services and Management
Subactivity: Payment to the DOC Working Capital Fund (ORF) transfer to Mission Services and Management (ORF)

	Object Class	2021 Enacted	2022 Transfer	2022 Base
11.1	Full-time permanent compensation	69,441	0	70,990
11.3	Other than full-time permanent	338	0	338
11.5	Other personnel compensation	1,945	0	1,944
11.7	NOAA Corps	661	0	0
11.9	Total personnel compensation	72,385	0	73,272
12	Civilian personnel benefits	22,923	0	25,421
13	Benefits for former personnel	52	0	52
21	Travel and transportation of persons	459	0	459
22	Transportation of things	145	0	149
23	Rent, communications, and utilitites	0	0	0
23.1	Rental payments to GSA	5,716	0	5,749
23.2	Rental Payments to others	666	0	666
23.3	Communications, utilities and misc charges	907	0	1,407
24	Printing and reproduction	370	0	376
25.1	Advisory and assistance services	18,691	0	18,791
25.2	Other services from non-Federal sources	17,698	0	18,918
25.3	Other goods and services from Federal sources	10,914	3,071	14,018
25.4	Operation and maintenance of facilities	0	0	0
25.5	Research and development contracts	0	0	0
25.6	Medical care	0	0	0
25.7	Operation and maintenance of equipment	0	0	0
25.8	Subsistence and support of persons	0	0	0
26	Supplies and materials	540	0	553
31	Equipment	1,186	0	1,207
32	Lands and structures	0	0	0
33	Investments and loans	0	0	0
41	Grants, subsidies and contributions	87	0	87
42	Insurance claims and indemnities	0	0	0
43	Interest and dividends	16	0	16
44	Refunds	0	0	0
99	Total obligations	152,755	3,071	161,141

*The 2022 Base column reflects the full 2022 Base for this Subactivity, including calculated ATBs and any additional transfers.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
TRANSFER CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Payment to the DOC Working Capital Fund
Subactivity: Working Capital Fund Transfer to DOC

	Object Class	2021 Enacted	2022 Transfer	2022 Base
11.1	Full-time permanent compensation	0	0	0
11.3	Other than full-time permanent	0	0	0
11.5	Other personnel compensation	0	0	0
11.7	NOAA Corps	0	0	0
11.9	Total personnel compensation	0	0	0
12	Civilian personnel benefits	0	0	0
13	Benefits for former personnel	0	0	0
21	Travel and transportation of persons	0	0	0
22	Transportation of things	0	0	0
23	Rent, communications, and utilitites	0	0	0
23.1	Rental payments to GSA	0	0	0
23.2	Rental Payments to others	0	0	0
23.3	Communications, utilities and misc charges	0	0	0
24	Printing and reproduction	0	0	0
25.1	Advisory and assistance services	0	0	0
25.2	Other services from non-Federal sources	0	0	0
25.3	Other goods and services from Federal sources	66,389	(396)	69,817
25.4	Operation and maintenance of facilities	0	0	0
25.5	Research and development contracts	0	0	0
25.6	Medical care	0	0	0
25.7	Operation and maintenance of equipment	0	0	0
25.8	Subsistence and support of persons	0	0	0
26	Supplies and materials	0	0	0
31	Equipment	0	0	0
32	Lands and structures	0	0	0
33	Investments and loans	0	0	0
41	Grants, subsidies and contributions	0	0	0
42	Insurance claims and indemnities	0	0	0
43	Interest and dividends	0	0	0
44	Refunds	0	0	0
99	Total obligations	66,389	(396)	69,817

*The 2022 Base column reflects the full 2022 Base for this Subactivity, including calculated ATBs and any additional transfers.

Exhibit 10

Department of Commerce
National Oceanic and Atmospheric Administration
PROGRAM AND PERFORMANCE: DIRECT OBLIGATOINS
(Dollar amounts in thousands)

		2020 Actuals		Enacted		2022 Base		2022 Estimate		Increase/Decrease From 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
MISSION SUPPORT (MS)											
Executive Leadership	Pos/BA	112	26,950	116	26,975	116	28,377	127	30,980	11	2,603
	FTE/OBL	119	27,469	110	26,975	110	28,377	119	30,980	9	2,603
Mission Services and Management	Pos/BA	511	2021 157,309	629	152,755		161,141	689	189,386	64	28,245
	FTE/OBL	543	150,116	598	152,755	594	161,141	644	189,386	50	28,245
IT Security	Pos/BA	12	16,452	20	15,378 625	20	15,865	20	35,365	0	19,500
	FTE/OBL	17	16,088	19	15,378	19	15,865	19	35,365	0	19,500
Payment to the DOC Working Capital Fund	Pos/BA	0	62,008	0	66,389	0	67,867	0	67,867	0	0
	FTE/OBL	0	64,588	0	66,389	0	67,867	0	67,867	0	0
Facilities Maintenance	Pos/BA	0	0	0	5,000	0	5,000	0	5,000	0	0
	FTE/OBL	0	0	0	5,000	0	5,000		5,000	0	0
Office of Education	Pos/BA	15	30,161	16	33,000	16	33,220	20	41,120	4	7,900
	FTE/OBL	15	30,256	16	33,000	16	0	19	41,120	3	7,900
Hollings Scholarship	Pos/BA	0	5,696	0	0	0 33,220	0	0	0	0	0
	FTE/OBL	6	6,318		0	0	0	0	0	0	0
TOTAL MISSION SUPPORT - ORF	**Pos/BA**	**650**	**298,576**	**781**	**299,497**	**777**	**311,470**	**856**	**369,718**	**79**	**58,248**
	FTE/OBL	**677**	**295,627 0**	**743**	**299,497**	**739**	**311,470**	**801**	**369,718**	**62**	**58,248**
Construction	Pos/BA	0	40,924	1	43,000	1	43,000	1	81,000	0	38,000
	FTE/OBL	2	34,208	1	43,000	1	43,000	1	81,000	0	38,000

Exhibit 10

Department of Commerce
National Oceanic and Atmospheric Administration
PROGRAM AND PERFORMANCE: DIRECT OBLIGATOINS
(Dollar amounts in thousands)

TOTAL MISSION SUPPORT - PAC	**Pos/BA**	**0**	**40,924**	**1**	**43,000**	**1**	**43,000**	**1**	**81,000**	**0**	**38,000**
	FTE/OBL	**2**	**34,208**	**1**	**43,000**	**1**	**43,000**	**1**	**81,000**	**0**	**38,000**
Spectrum Relocation Fund - ORF	**Pos/BA**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0	0
	FTE/OBL	**2**	**1,463**	**0**	**14,081**	**0**	**9,817**	**0**	**9,817**	0	0
Spectrum Relocation Fund-PAC	**Pos/BA**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	FTE/OBL	**0**	**18,962**	**0**	**32,247**	**0**	**15,637**	**0**	**15,637**	**0**	**0**
Spectrum Efficient National Surveillance Radar - ORF	**Pos/BA**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	FTE/OBL	**0**	**2,001**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Spectrum Pipeline - ORF	**Pos/BA**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	FTE/OBL	**0**	**198**	**0**	**1,666**	**0**	**0**	**0**	**0**	**0**	**0**
TOTAL MISSION SUPPORT	**Pos/BA**	**650**	**339,500**	**782**	**342,497**	**778**	**354,470**	**857**	**450,718**	**79**	**96,248**
	FTE/OBL	**681**	**352,459**	**744**	**390,491**	**740**	**379,924**	**802**	**476,172**	**62**	**96,248**

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activities: Executive Leadership, Mission Services and Management, IT Security, Payment to the DOC Working Capital Fund, Office of Education and Facilities Maintenance

Goal Statement

The objectives of these Mission Support activities are to: 1) develop policies regarding the administration of NOAA programs with Federal agencies, the Congress, and private industry; and 2) develop and implement policy, planning, and program oversight.

Base Program

NOAA's Mission Support services are the backbone of NOAA's programs and mission. These services provide the planning, administrative, financial, procurement, information technology, human resources, and infrastructure services that are essential to the safe and successful execution of NOAA's mission.

Statement of Operating Objectives

Schedule and Deliverables:

AGO

- Continue efforts to decrease backlog of required contract closeouts
- Continue to track fees generated against fee projections (cumulative total including fee for service, NOAALink and ProTech)
- Strengthen alignment of acquisition resources to NOAA program requirements
- Increase AGO/Program Office engagement early in the acquisition/grants lifecycle

OCAO

- Continue implementing the Silver Spring Metro Center Consolidation Project to reduce NOAA's leased portfolio costs in the National Capital Region
- Continue implementation of the NOAA Asset Management Program to support data driven decision making and reporting
- Maintain, and possibly increase, focus on timely resolution of commercial leases

- Complete the National Strategic Facilities Plan and begin implementing highest priority projects.
- Continue the safety culture that has been established at NOAA over the past four years
- Successfully execute construction and repair projects on time and within budget

OCFO

- Continue to deliver DOC Strategic Planning and Performance elements ahead of schedule
- Execute at least one major economic reporting product (e.g. NOAA by the numbers)

OCIO

- Incorporate machine learning and automation into Security Operations
- Expand NOAA's enterprise network to achieve economic efficiencies and increased reliability
- Establish a sustainable relationship with industry to provide enhanced, cloud-based access to NOAA's environmental data
- Continue to increase utilization of the cloud

OHCS

- Expand and institutionalize NOAA's talent acquisition, recruitment and retention approaches and programs; significantly improve NOAA hiring by attracting and hiring more diverse talent in both scientific and support fields with a particular focus on attracting qualified candidates among minorities and underserved communities
- Mature and broaden use of HR IT tools and applications throughout NOAA to provide data-in-depth for detailed HR analytics
- Continue to implement a Full Service HR Model for NOAA within the Department's enterprise architecture
- Initiate a new NOAA Facilitation Network based on the success of a recently completed pilot effort.
- Continue to expand excellent coordination achieved with other NOAA organizations, specifically the Office of Inclusion and Civil Rights (OICR) and the Office of Education, to implement continuous improvement in all facets of hiring and developing a fully diverse professional workforce

OICR

- Process Equal Employment Opportunity (EEO) complaints of discrimination
- Sustain and maintain a Model EEO program (EEO Commission mandate)
- Conduct targeted outreach (underrepresented populations)
- Conduct organizational climate assessments
- Foster an inclusive culture within the agency

- Manage the Agency's Diversity and Inclusion Implementation Plan
- Educate the workforce (EEO & Diversity and Inclusion training; Special Emphasis Programs)
- Manage Special Emphasis Programs and Employee Resource Groups

WVPRP

- Increase response services spanning across all of NOAA's regions
- Increase prevention services with computer-based training and in-person bystander intervention, development of resiliency training
- Expand the RAINN contract to include dedicated hotline/helpline for SASH response services
- Develop and maintain of a workplace violence database
- Develop and maintain of a workplace violence prevention website
- Develop toolkits for employees and management, outreach materials
- Participate in the National Academies of Science Action Collaborative
- Create, and provide regional program coordinators to include Alaska
- Develop methods to address intersectionality, racial equity, and mission related needs

OED

- Advance education both within NOAA and with the public we serve
- Educate and train the students in NOAA-related fields through the Jose E Serrano Educational Partnership Program with MSIs and the Hollings Scholarship Program
- Support meaningful watershed education through the Bay Watershed Education and Training Program
- Support formal and informal education projects that build community resilience through the Environmental Literacy Program.
- Coordinate educational activities across NOAA and with external partners to ensure that these efforts are effective and continually improve

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Explanation and Justification

Comparison by subactivity		2020 Actuals Personnel	2020 Actuals Amount	2021 Enacted Personnel	2021 Enacted Amount	2022 Base Program Personnel	2022 Base Program Amount
Executive Leadership	Pos/BA	112	26,950	116	26,975	116	28,377
	FTE/OBL	96	27,469	110	26,975	110	28,377
Mission Services and Management	Pos/BA	511	157,309	629	152,755	625	161,141
	FTE/OBL	543	150,116	598	152,755	594	161,141
IT Security	Pos/BA	12	16,452	20	15,378	20	15,865
	FTE/OBL	17	16,880	19	15,378	19	15,865
DOC Working Capital Fund	Pos/BA	0	62,008	0	66,389	0	67,867
	FTE/OBL	0	64,588	0	66,389	0	67,867
Facilities Maintenance	Pos/BA	0	0	0	5,000	0	5,000
	FTE/OBL	0	0	0	5,000	0	5,000
Education	Pos/BA	15	30,161	16	33,000	16	33,220
	FTE/OBL	15	30,256	16	33,000	16	33,220
Hollings Scholarship	Pos/BA	0	5,696	0	0	0	0
	FTE/OBL	6	6,318	0	0	0	0
Total Mission Support	Pos/BA	650	298,576	781	299,497	777	311,470
	FTE/OBL	677	295,627	743	299,497	739	311,470

Executive Leadership

Executive Leadership supports the leadership and management of NOAA, and represents NOAA at the executive level with other Federal agencies, Congress, NOAA stakeholders, and private industry.

The Offices of the Under Secretary/Assistant Secretary and Deputy Under Secretary (USAO): These offices support NOAA's leadership. Program activities consist of formulating and executing policies for achieving NOAA objectives, responding to Executive Branch policy decisions, and exercising delegated authority in committing NOAA to courses of action. USAO also includes the following offices:

Office of Legislative and Intergovernmental Affairs (OLIA): This office serves as the primary liaison for NOAA with the members and staff of Congress. The office is responsible for the planning, direction, and coordination of legislative programs that are of immediate concern to the Office of the Under Secretary.

Office of Communications and External Affairs: This office is the principal point of contact for NOAA programs with the public and the news media. Its staff advises NOAA and other Departmental officials on all aspects of media relations and communication issues.

Office of International Affairs (OIA): This office coordinates NOAA and other leadership officials' relationship's with international programs, as directed by the Office of the Under Secretary. The Director of the Office of International Affairs exercises a leadership role in establishing policies, guidelines, and procedures for NOAA's international programs.

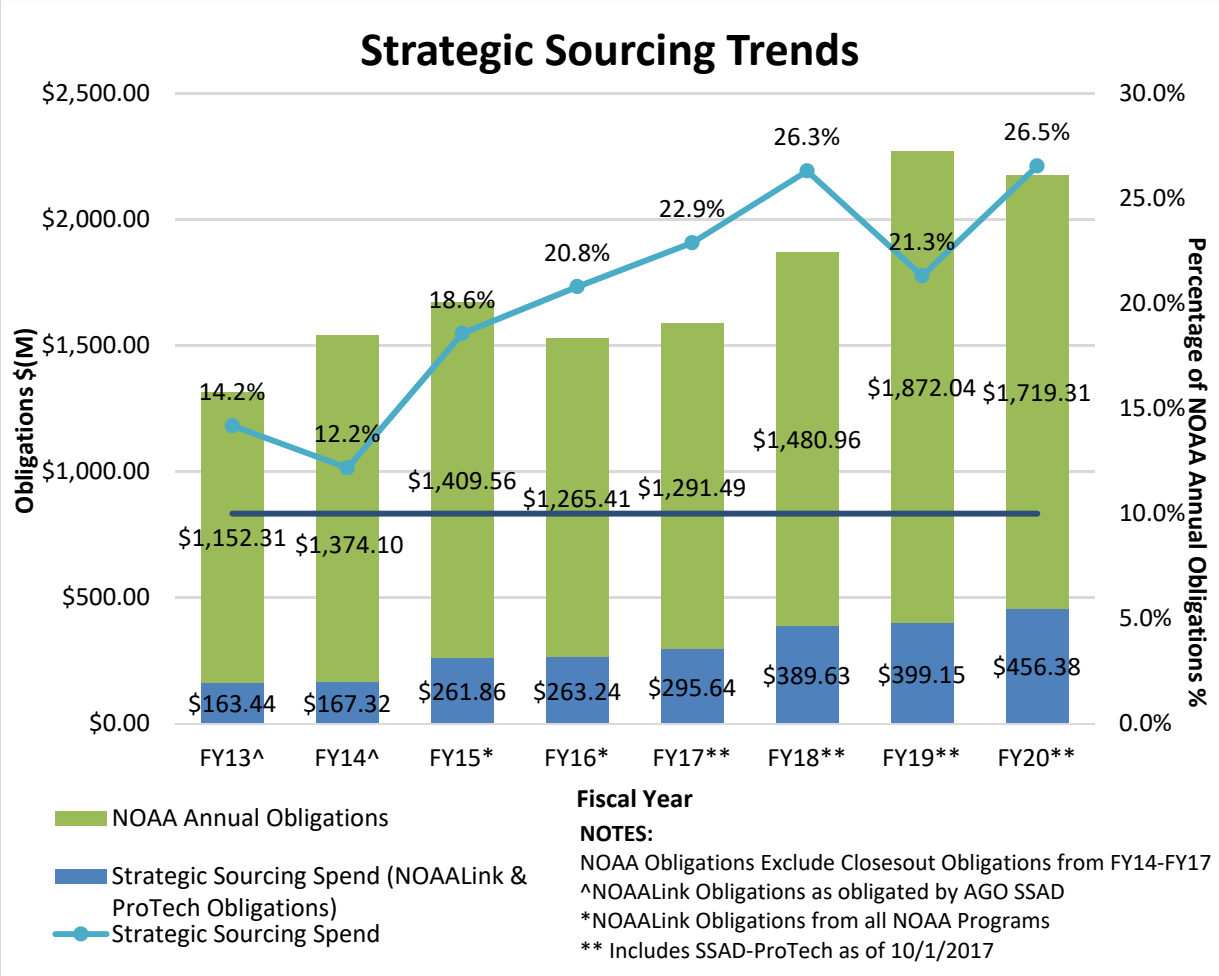
Office of the Federal Coordinator for Meteorology (OFCM): This office establishes procedures for systematic and continuing review of national basic specialized meteorological and oceanographic requirements for services and supporting research. It also brings Federal agencies concerned with international activities and programs in meteorological and oceanographic programs into close consultation and coordination. This office is funded through an assessment of funds from NWS, OAR, and NESDIS.

Office of General Counsel (OGC): OGC provides legal advice, review, and representation on a host of complex matters arising from the fulfillment of NOAA's mission. NOAA OGC ensures NOAA management decisions are made with necessary consideration of proper legal requirements, procedures, and options.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Mission Services and Management
Mission Services and Management is the mission-enabling arm of NOAA that supports all operational activities and is essential to its success.

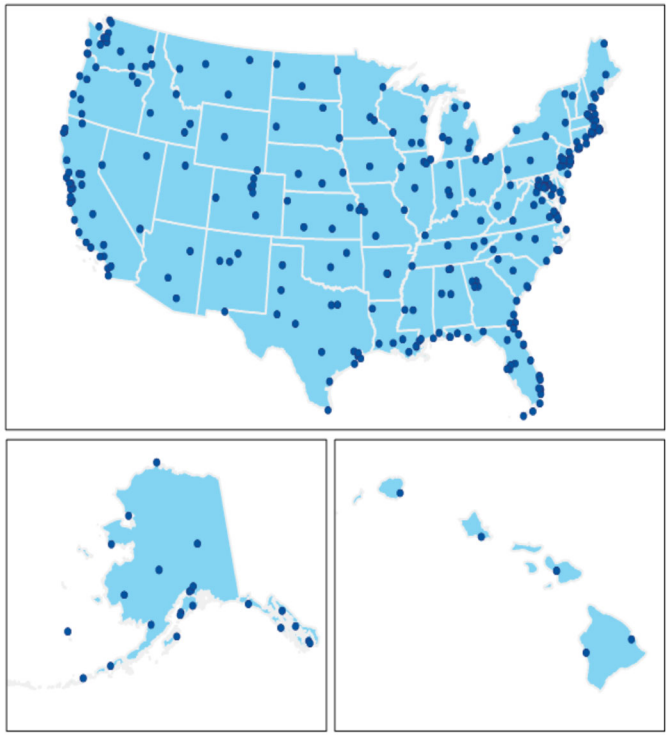
Acquisition and Grants Office (AGO): AGO provides high-value services to NOAA Line and Staff Offices, compliant with laws and regulations, on time, and at the best value to the government through the planning, solicitation, award, administration, and closeout of nearly 23,000 acquisition and financial assistance transactions annually. NOAA's ability to accomplish its mission and achieve its goals depends significantly on AGO's ability to process over $3 billion annually in accordance with statutory and regulatory requirements. In FY 2020 for example, AGO executed 22,910 acquisition transactions, obligating $1.72 billion and managing over 4,500 active contracts valued at over $5 billion. AGO executed over 2,300 financial assistance transactions to award $1.52 billion. NOAA also successfully executed over 9,300 acquisition and nearly 800 financial assistance closeout actions in FY 2020.



In addition, NOAA continued its strong support of small businesses in FY 2020, obligating $823 million to small businesses equating to a 50.6 percent overall small business achievement for the year. AGO also continued to place emphasis on NOAA's two key strategic sourcing initiatives, NOAALink program and ProTech Acquisition Initiative, to improve efficiency and reduce costs. In FY 2020, 26.5 percent of NOAA dollars were awarded via strategic sourcing vehicles.

Office of the Chief Administrative Officer (OCAO):

NOAA's national scope and mission requires a diverse portfolio of geographically distributed facilities. OCAO supports NOAA-wide mission accomplishment by oversight, technical expertise and support services for the stewardship of NOAA's assets, facilities, and infrastructure. NOAA's real property portfolio has more than 690 owned properties including 4,675 acres of land across 160 markets, including 401 NOAA-owned facilities with an estimated replacement value of $3 billion; and administers a personal property portfolio of approximately 141,000 personal property assets valued at over $17 billion. OCAO manages the Safety and Occupational Health program, coordinates security and anti-terrorism risk protection, and ensures best business practices around records and financial controls.



Current NOAA Footprint

In 2017, NOAA launched the NOAA 2030 Footprint initiative to develop and implement best practices and tools for facilities sustainment. The initiative consists of three major projects: developing and implementing a Strategic Facilities Plan for 2030; consolidating four locations around the National Capital Region into NOAA Headquarters in Silver Spring, MD; and implementing asset management tools to track facility condition use. In FY 2018, NOAA completed a facilities enterprise baseline, footprint framework, and regional opportunities analysis as steps towards the Strategic Facilities Master plan. In FY 2019, NOAA completed a pilot regional analysis of the Northwest and Alaska as the first of several regional studies that will inform the master plan. In FY 2020, NOAA completed footprint studies for the Northeast and Southeast regions. Efforts started in FY 2020 to complete a

comprehensive facility condition assessment of the Western Regional Center in anticipation of implementing the regional plan in FY 2021.

NOAA is implementing asset management tools to document, analyze, track and report conditions, repair needs, space use, replacement value and sustainment cost for its owned assets. Additionally, NOAA created standardized processes for how and what real property data is collected, and awarded a contract to validate the data on seventy-five percent (1.8 million gross square feet) of NOAA's inventory of owned properties. Upon full implementation of the asset management program, NOAA will have a repeatable, traceable, and accurate owned facility data set. With this information, NOAA executives will make data-driven decisions to best utilize limited resources to sustain its mission-critical footprint.

Office of the Chief Financial Officer (OCFO): OCFO serves as NOAA's principal financial manager. NOAA has annual appropriated resources of almost $6 billion and recorded capital asset value in excess of $7 billion. OCFO is responsible under the CFO Act to provide the leadership necessary for NOAA to obtain an annual 'unqualified opinion' on the audit of its consolidated financial statements. The areas under the direction of the OCFO are the Budget Office, the Finance Office, Performance, Risk and Social Science Office (PRSSO), the DOC Working Capital Fund (WCF), Common Services and the NOAA Direct Bill. The Budget Office provides oversight, management, outreach and communication of the budget process, which includes coordinating the preparation of budget submissions, and allocating and controlling the execution of all budgetary resources. The Finance Office ensures that the consolidated financial statements and reports are accurate, manages and operates the financial management system, and is responsible for the timely payment of bills. The PRSS Office leads and deploys best practices from social science integration and enterprise performance and risk management to advance NOAA's mission.

DOC Accounting System (CBS application): The CBS application requires that the application (along with associated interfaces and feeder systems) be operated, maintained, and enhanced. Changes to the system need to be tested to ensure that integrity, availability, and confidentiality are maintained within the context of a secure application environment. The CBS user community (which consists of over 10,000 users across the agency) requires ongoing helpdesk services and training. Ongoing maintenance and support of CBS allows NOAA to maintain compliance with legal, regulatory and executive requirements such as the OMB Circular A-123 and the Federal Information Security Management Act (FISMA) and allows NOAA managers to have access to financial data necessary to make informed decisions. CBS system components have reached end of life and NOAA is taking mitigating actions in the interim such as extending maintenance agreements and identifying other technical alternatives to continue operations. NOAA has upgraded the CBS technical architecture (i.e., hardware, system software, supporting infrastructure) to ensure the operability of CBS at NOAA through migration to DOC's Business Administrative Systems solution.

Common Services (CS) account: The Common Services account supports the NOAA CFO in providing resources for NOAA-wide activities and services provided through the DOC and other agencies through Memoranda of Understanding (MOU) and/or Interagency Agreements (IA). CS funds the Departmental Management Advances and Reimbursements (A&R) accounts providing a centralized funding source for special services and tasks provided by the DOC; off-site health services at the Census Bureau Health Unit; OPM USAJobs portal usage and maintenance; and other miscellaneous services and products.

NOAA Direct Bill Process: The NOAA Direct Bill process enables NOAA Line and Staff Office service providers to assess other Line and Staff Offices for their proportionate share of the costs of enterprise-wide programs or services. Direct Bill proposals are only for unique services/products that provide an enterprise-wide benefit or that consolidate funding for enterprise solutions.

Office of the Chief Information Officer (OCIO): NOAA OCIO's operating model focuses on service delivery, customer experience, innovation, and security with a mission to provide a secure and agile information enterprise with advanced computing capability that propels NOAA's scientific and operational missions. The cornerstone of the operating model is delivering shared enterprise information services through technology advancements including cloud computing, mobile devices, and big data. NOAA generates terabytes of data each day from satellites, radars, ships, weather models, and other sources. While these data are available to the public, the NOAA Big Data Program (BDP) provides public access to NOAA's open data on commercial cloud platforms through public-private partnerships. These partnerships remove obstacles to the public use of NOAA data, help avoid costs and risks associated with Federal data access services, and leverage operational public-private partnerships with the cloud computing and information services industries. The BDP combines an expansive collection of high-quality environmental data and expertise, the vast infrastructure and scalable computing capabilities of our industry partners, and the innovative energy of the American economy. The BDP works with Infrastructure as a Service providers to broaden access to NOAA's data resources.

OCIO provides the enterprise IT infrastructure that connects and manages networks, telecommunications, systems, and people to enable NOAA to provide data observation, ingestion, assimilation and modeling, processing, dissemination, and archiving capabilities at greater scales. OCIO has established five NOAA Information Resources Management strategic goals: (1) promote our people who make the mission possible; (2) propel the mission; (3) protect the mission; (4) deliver customer-centric service excellence; and (5) optimize for maximum NOAA value. OCIO improves customer experience and productivity by increasing collaboration tool utilization, and focused resources on modernizing and streamlining IT systems to protect against cyber-attack, equipment malfunctions, or natural disasters. The Research and Development (R&D) High Performance Computing (HPC) program provides research that contributes directly to operating high performance computers and data systems for NOAA to deliver improved weather models. These models are used to understand and predict weather, and to produce decision-support tools that facilitate understanding weather, mitigation strategies, and adaptation options for the Nation. The goal of the program is to develop, test, and

apply state-of-the-science computer-based simulation models, based upon a strong scientific foundation while leveraging leading edge HPC and information technologies. The objective is to increase the skill, resolution, complexity, and throughput of computer model-based projections.

Office of Human Capital Services (OHCS): OHCS provides human capital programs, consultative services, policies and processes that facilitate the acquisition, development and retention of a diverse, highly skilled, motivated, and effective workforce capable of accomplishing the Agency's mission. In FY 2021, OHCS continues to implement distinct hiring improvements achieved in FY 2020 by reducing time-to-hire days, refining communications with Line and Staff Offices hiring managers, and completing a pilot project to accelerate portions of the hiring timeline. OHCS launched its new and dynamic LANTERN (Leveraging Abilities, Needs, Talents Energies & Resources Network) program which enables all Line and Staff Offices to provide detail opportunities to NOAA personnel that support distinct organizational needs while promoting individual professional growth and experience. The office initiated the first NOAA-wide senior executive continuing education program in concert with a nationally known university who provides a tailored program of instruction. OHCS also provides a wide range of human capital functions including strategic human capital planning, labor-management and employee relations, accountability and quality assurance, HR policy, performance management and incentives, executive and employee support, leadership development, training and career development, personnel mentoring, HR data management, recruitment and hiring, and HR information technology systems.

In addition, OHCS oversees HR functions including staffing, classification, hiring actions, personnel action request processing services, and compensation and benefits provided by the Department's new Enterprise Services model of HR delivery. These enterprise services to provide transactional support were outsourced to provide focused, efficient and cost-effective products and services to NOAA organizations and employees. OHCS has implemented the NOAA Strategic Human Capital Management Plan; engaged new vendors and partners and provided detailed and improved workforce planning support; adopted new technologies and features including those embedded in HR Connect (a multi-faceted human capital transactions software application supporting all of NOAA), and chairs the NOAA Human Resource Collaborative to provide close coordination with each Line and Staff Office regarding all HR matters. In FY 2021, OHCS continued to expand its use of its Consulting Model and Customer Engagement Tool Kit to guide HR personnel with customer interactions and used Human Centered Design processes to achieve customer- centric approaches to solutions. These achievements provided improved transparency of human capital actions and greater consistency of services while 1) capitalizing on economies of scale and efficiency and 2) improving the quality of services provided. OHCS also took distinct actions to hire in-house expertise and capture experienced vendor support to improve employee and labor relations for NOAA and eliminated a large historical backlog of inquiries from employees based on allegations of harassment.

In FY 2022, NOAA will continue to charge customers (Line and Staff Offices) directly for HR transactional services being provided and talent acquisition services being developed by the Department's Enterprise Services model. Simultaneously, OHCS will expand its develop of a

NOAA-wide recruiting-hiring-retention portfolio of projects with a distinct focus on minority recruiting, while also expanding its robust consultative services to provide human capital expert advisors dedicated to individual Line and Staff offices to ensure mission alignment, unity of purpose and customer satisfaction. In addition, OHCS will continue to mature specific centers of expertise to advance strategic and practical developments in workforce strategy, performance culture and learning, and human resource analytics to support all of NOAA. OHCS will continue to expand its NOAA-wide mentoring program, the NOAA Honors Program, and will field additional advanced HR analytic services using artificial intelligence (AI) and state-of-the-art tools and applications while also initiating a formal NOAA Facilitation Network. At the same time NOAA will provide tailored HR consultative services to support NOAA's organizational excellence and adaption to the post COVID-19 environment.

Office of Inclusion and Civil Rights (OICR): OICR is responsible for ensuring NOAA-wide compliance with EEO and Civil Rights laws, regulations, executive orders, and policies that prohibit discrimination on the basis of race, color, religion, sex, national origin, age, disability, sexual orientation, and genetic information. OICR manages the agency's EEO complaint program for a workforce of over 11,000. Compliance rates for processing informal cases within prescribed timelines consistently succeed EEO Commission statutory requirements. In FY 2022, OICR continues to seek innovative methods to enhance efficiency in all EEO program functions.

OICR manages the agency's Diversity and Inclusion (D&I) program and oversees affirmative employment initiatives. OICR's mission is to ensure that D&I is a business priority that becomes ingrained into NOAA's organizational culture enhancing it's standing as an Employer of Choice. OICR identifies and deploys D&I best practices to promote D&I agency-wide. These efforts have resulted in NOAA's selection one of the Top 50 Science, Technology, Engineering, and Math (STEM) workplaces by the American Indian Science and Engineering Society in 2019. In addition, NOAA was selected as one of the Top 20 supporters of Historically Black Colleges and Universities for the past 3 consecutive years. To ensure the agency's workforce is knowledgeable about practices which promote inclusion and strategies to overcome barriers to diversity, OICR provide EEO and D&I training at all levels. OICR staff provide advice and counsel to employees and agency leaders regarding conducting outreach activities to underrepresented populations, organizational climate, and strategies to attract, hire, develop, and retain a highly skilled and diverse workforce.

To promote D&I and cultural awareness, OICR offers nine Special Emphasis programs annually. In addition, OICR plans and coordinates the agency's premiere annual D&I training event, the D&I Summit. The D&I Summit reinforces NOAA's commitment to D&I initiatives and acquires top talent from the D&I industry to facilitate training content based on the needs of the agency. From an outreach perspective, OICR ensures NOAA's presence at affinity group conferences to attract underrepresented populations within the civilian labor force and further promote NOAA as an Employer Choice. OICR staff serve as Special Emphasis Program Managers

who provide oversight and guidance for 11 Employee Resource Groups which serve a valuable resource for employees and NOAA leaders.

OICR conducts annual Organizational Climate Assessments to gather information from the workforce which provides insight about perceptions about the culture within the agency. The data obtained is analyzed to identify practices that may have a negative impact on organizational effectiveness. The OICR Director meets with Line/Staff Office senior leaders on a quarterly basis to discuss and assist with developing courses of action to address EEO/D&I issues. OICR is committed to expanding its D&I portfolio to keep the needle moving towards greater diversity, inclusion, equality.

Workplace Violence Prevention and Response Program (WVPRP): The WVPRP was created to comply with two separate laws; the 2015 Congressional mandate (33 U.S.C § 893) and the 2016 National Defense Authorization Act (NDAA) for the fiscal year 2017 sections 3542-3547 (Actions to Address Sexual Assault at NOAA). In 2016, the Public Law 114-328, Subtitle C – Sexual Harassment and Assault Prevention at the National Oceanic and Atmospheric Administration, 33 U.S.C. § 894 was passed. This law affects provisions for a program to respond to and prevent SASH- sexual assault/sexual harassment- at the agency. On February 26, 2018, Public Law 114-328, NOAA's Sexual Harassment and Sexual Assault Prevention and Response [SASH] Policy (Administrative Order 202-1106), was issued. The 2015, and 2016 mandates directed NOAA to stand up a Workplace Violence Prevention and Response Program manager. In August 2018, a program manager was selected to develop and implement prevention and response services for the Agency. The program office is organized as a Staff Office supporting the Deputy Under Secretary of Operations. The WVPRP will develop comprehensive services for victims of sexual assault and sexual harassment (SASH) for all NOAA employees, contractors, and affiliates. This dictates that there be full-time victim advocates for the agency and collateral victim advocates across NOAA by region. The program also develops comprehensive and centralized prevention for all NOAA employees; tracks incidents and cases of workplace violence and coordinates the annual congressional report; provides ongoing consultation to leadership; and coordinates the development of the workplace violence prevention plan, which creates goals to be reviewed biannually.

IT Security

The mission of the IT Security Program is to defend NOAA's data, networks, equipment, intellectual property and personnel against a wide variety of adversaries ranging from nation states to lone-wolf attackers. Successful attacks by adversaries could negatively impact NOAA's ability to keep nearly 330 million Americans, as well as others, safe and informed of weather, environmental, and other events with widespread economic impact. Additionally, with NOAA's reliance on information systems and data connected to the Internet, cyber-espionage is an effective, low-cost, low-risk way to compromise data and information products and services. NOAA's

interconnected nature presents significant risk to IT infrastructure components and data. OCIO implements NOAA's IT Security Program through a risk-based approach that emphasizes vulnerability management to achieve defense in depth via a common prevention, response, and mitigation strategy to manage mission risk related to cyber security threats.

High-priority risks include insider threat, network segmentation, national/international/non-state adversaries, social engineering attacks, botnets, and malware/ransomware. Major initiatives include improving system segmentation to limit adversaries from traversing from external facing systems to internal resources, full monitoring of all NOAA end points, improving the quality of enterprise IT security services and the implementation of all five phases of the DHS Continuous Diagnostic Monitoring Program.

The IT Security Program continues its efforts to increase the efficiency of base-level functionality, which resulted in significantly increased visibility into defending the NOAA networks and systems. This includes building out our sensors so more NOAA systems are sending information to our centralized network defense systems, better integration of cyber threat intelligence, and better processes and procedures to use this data. The NOAA Cyber Security Center delivers enterprise-wide cybersecurity services to all NOAA systems; these services include Security Operations Center (SOC) operations, Trusted Internet Connection (TIC) operations, endpoint security, audit log archival, incident response, IT security policy, compliance, risk management, oversight and training, continuous monitoring, IT security infrastructure, and IT security project management.

Payment to the Department of Commerce (DOC) Working Capital Fund (WCF)

The DOC WCF provides centralized services to NOAA's Line and Staff Offices in the most efficient and economical manner. Organizational units within DOC provide the administrative, legal, information technology, financial, and policy support needed to accomplish NOAA's overall mission. The WCF was established pursuant to 5 USC 607 (15 USC 1521). Unlike other DOC bureaus, the NOAA contribution to the WCF is provided by specific allocation within the NOAA appropriation.

Office of Education

The Office of Education guides and underpins education activities across NOAA resulting in a more efficient and effective portfolio, better able to support NOAA priorities. The Office supports NOAA's mission by working with students, educators, and the general public so they understand NOAA's science and can use it to make decisions. The Office fosters a diverse future workforce trained in STEM by providing quality educational opportunities for the next generation, including competitive scholarships, internships and professional training for post-secondary students.

The Office of Education provides advice and counsel to the Under Secretary of Commerce for Oceans and Atmosphere in matters pertaining to education, coordinates education activities across NOAA through the NOAA Education Council and represents the Agency in inter-agency education initiatives. Activities build capacity in STEM education to use NOAA assets to reach more people in effective ways. The Office lays out the goals and objectives for NOAA's education programs and supports data-driven program assessments, enabling a learning culture able to evolve and improve education efforts. The Office of Education works with institutions and networks to build capacity to advance NOAA's mission through formal (K-12) and informal education at national, regional and community levels. Among the Office's accomplishments:

- Managed www.noaa.gov/education to provide an integrated, NOAA-wide portal for education resources and opportunities that got over 1.7 million visits in FY 2020
- Enhanced NOAA Citizen Science Community of Practice with 215 members representing projects that provide more than 1.1 million volunteer hours per year
- Developed implementation plan with over 100 actions in support of NOAA's Education 2021-2040 Strategic Plan across the Agency by working with the NOAA Education Council as required by America COMPETES Act statutory authority
- Coordinated 25 aquariums and marine science education institutions through the Coastal Ecosystems Learning Centers network and 154 educational institutions through the Science on a Sphere® network

José E. Serrano Educational Partnership Program with Minority Serving Institutions (EPP/MSI): EPP/MSI provides financial assistance, through competitive processes, to students and MSIs that train students and conduct research in NOAA mission sciences. The program's goal is to increase the number of students, particularly from underrepresented groups, who are trained and earn degrees in sciences directly related to NOAA's mission. Long term goals of the program include increasing the diversity of the STEM and NOAA workforce and fostering American competitiveness in STEM fields. Among EPP's accomplishments:

- Over 2,400 degrees granted to higher education students in NOAA mission fields since 2001
- Approximately 75 percent of graduates are from underrepresented minority groups
- 325 PhDs granted in NOAA mission disciplines
- 285 students in NOAA mission fields currently in the pipeline

For more information, please visit the EPP/MSI website: http://www.noaa.gov/epp

Ernest F. Hollings Scholarship Program: The NOAA Hollings Scholarship Program is a competitive program that increases undergraduate training in oceanic and atmospheric sciences, research, technology, and education. The program catalyzes scientific research through work-based learning experiences, improves environmental literacy, and prepares the STEM workforce for the

future. It recruits and prepares students for careers with NOAA and other natural resource and science organizations at the Federal, state and local levels of government, in academia and the private sector, as well as in science and environmental education. In 2020, the Hollings Scholarship Program supported 123 scholars while continuing to support 125 scholars from the class of 2019.

Based on the FY 2022 Request of $6.983 billion, NOAA estimates it will have $6.983 million for the Hollings Scholarship Program. For more information, please visit the Hollings Scholarship website: http://www.noaa.gov/hollings

Environmental Literacy Grants: NOAA's Environmental Literacy Grants provides support for STEM and environmental education projects that engage and involve children, youth, and adults in using NOAA-related sciences to improve ecosystem stewardship and increase resilience to extreme weather and climate events. Multi-year grants and cooperative agreements are competitively awarded to formal (K-12) and informal educational institutions within the United States. Since 2015, in addition to supporting broad STEM education projects, the program has prioritized funding community resilience education projects that empower people, especially those who have been historically marginalized, to learn about and become involved in creating a healthier, more resilient, and equitable community. Environmental Literacy Grants accomplishments include the following:

- $79 million provided through 142 awards since the program's inception in 2005
- In FY 2020, more than 146 institutions advanced NOAA's mission to enhance awareness and understanding of ocean, coastal, Great Lakes, and atmospheric sciences through formal (K-12) and informal education initiatives
- In FY 2020, over 15,000 youth and adults participated in informal science education programs
- In FY 2020, over 1,000 educators participated in professional development programs using evidence-based practices conveying ocean, coastal, Great Lakes, and atmospheric sciences in compelling and relevant ways. In FY 2020, over 5,000 K-12 students participated in formal science education programs

For more information, please visit https://www.noaa.gov/office-education/elp

Bay-Watershed Education and Training (B-WET): B-WET is an environmental education program that promotes locally relevant, experiential learning in the K-12 environment through competitive funding that promotes Meaningful Watershed Educational Experiences. Whether working with students directly or providing professional development to educators, B-WET grants empower students to investigate local and global environmental issues that affect their lives, choices, and communities. Students identify actions to address these issues, enabling them to understand, protect, and restore watersheds and related ocean, coastal, and Great Lakes ecosystems. B-WET currently serves seven areas of the country: California, Chesapeake Bay, Great Lakes, Gulf of Mexico, Hawai'i, New England, and the Pacific Northwest. B-WET accomplishments include the following:

- B-WET grants reached over 73,100 students and 3,600 teachers in 2020 through awards to 130 institutions.

- Since the program's inception in 2002 NOAA has awarded over $100 million to support more than 820 projects.
- NOAA began implementing a multiyear $3.2 million partnership with the Department of Education's 21st Century Community Learning Centers. Through a partner, 29 grants serving 17 states were awarded in June, 2020. These projects provide locally relevant, out-of-school time STEM programming to students in high-poverty and low performing schools based on the B-WET MWEE model and include NOAA assets and expertise.

For more information, please visit the B-WET website: https://www.noaa.gov/office-education/bwet.

Facilities Maintenance

Facilities Maintenance funds are administered by OCAO and provide centralized support to address the growing backlog of deferred maintenance and repair needs at NOAA facilities as well as project management and planning. In FY 2022, NOAA will continue to reduce the backlog of deferred maintenance and repair across the NOAA facilities portfolio, provide project and program management, begin pre-planning for Silver Spring Metro Center lease requirements and begin a business case analysis for a National Coastal Mapping and Aquaculture Center of Excellence at the University of New Hampshire.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Executive	Pos./BA	116	28,377	118	28,877	2	500
Leadership	FTE/OBL	110	28,377	112	28,877	2	500

NOAA Tribal Liaison (+$500, 2 FTE/2 Positions) - NOAA requests additional funds to create two full-time NOAA Tribal Liaison positions to strengthen NOAA communications and outreach to Tribal governments, Native Alaska Corporations, and Native Hawaiians; one in Juneau, Alaska and one located in the Washington DC metro area. The Tribal Liaisons will support meaningful consultations and coordination with tribal officials in the development and implementation of Federal policies that have tribal implications. This initiative supports Executive Order (EO) 13175, DAO 218-8, and the Department of Commerce Tribal Consultation Policy, which mandate Federal agencies appropriately engage with tribal officials. The liaisons will be responsible for filling an existing gap by providing timely government to government consultation on NOAA policies and actions that impact Indian Tribes. They will also manage appropriate training for NOAA officials engaged in tribal relations to identify and expand best consultation practices.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

Schedule and Milestones:
FY 2022-2026:

- Create two full-time positions for Tribal Liaisons for NOAA
- Train NOAA officials engaged in government-to-government consultations in best practices for tribal relations
- Provide funding for conference travel, attendance and registration where required

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Deliverables:

- Procedures to ensure timely and meaningful government-to-government consultation on NOAA policies and actions that have a substantial effect on tribes
- Procedures for recording government-to-government consultations and outcomes
- Training for NOAA officials engaged in government-to-government consultations

Performance Measures	2022	2023	2024	2025	2026
Proportion of Federally-recognized Tribes consulted by NOAA					
With Increase	12%	22%	27%	30%	30%
Without Increase	10%	10%	10%	10%	10%
Outyear Costs:					
Direct Obligations	500	500	500	500	500
Capitalized	0	0	0	0	0
Uncapitalized	500	500	500	500	500
Budget Authority	500	500	500	500	500
Outlays	310	310	310	310	310
FTE	2	2	2	2	2
Positions	2	2	2	2	2

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Executive Leadership
Subactivity: Executive Leadership
Program Change: NOAA Tribal Liaison

Title		Grade	Number	Annual Salary	Total Salaries
Senior Tribal Liaison		ZA-IV	1	164,065	164,065
Tribal Liaison		ZA-III	1	116,039	116,039
Total			2		280,104
Less lapse	25.00%		(1)		(70,026)
Total full-time permanent (FTE)			2		210,078
2022 Pay Adjustment (2.7%)					5,672
					215,750

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	2
Total FTE	2
Authorized Positions:	
Full-time permanent	2
Total Positions	2

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Executive Leadership
Subactivity: Executive Leadership

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	13,691	14,803	15,165	15,381	216
11.3	Other than full-time permanent	350	350	350	350	0
11.5	Other personnel compensation	717	700	700	700	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	14,758	15,853	16,215	16,431	216
12	Civilian personnel benefits	5,655	6,000	6,708	6,773	65
13	Benefits for former personnel	6	6	6	6	0
21	Travel and transportation of persons	385	300	300	350	50
22	Transportation of things	8	8	8	8	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	2,294	2,000	2,079	2,079	0
23.2	Rental Payments to others	1,472	1,000	1,000	1,005	5
23.3	Communications, utilities and misc charges	288	200	400	430	30
24	Printing and reproduction	7	7	7	17	10
25.1	Advisory and assistance services	766	500	500	510	10
25.2	Other services from non-Federal sources	1,033	800	846	846	0
25.3	Other goods and services from Federal sources	158	100	100	190	90
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	209	100	105	129	24
31	Equipment	136	100	102	102	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	293	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	1	1	1	0
44	Refunds	0	0	0	0	0
99	Total obligations	27,469	26,975	28,377	28,877	500

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Executive Leadership	Pos./BA	116	28,377	125	30,377	9	2,000
	FTE/OBL	110	28,377	117	30,377	7	2,000

Strategic Communication and Outreach to Underserved Communities (+$2,000, 7 FTE/9 Positions) – The Office of Communications will enhance strategic communications capacity, with the goal of reaching and engaging new, diverse and underserved public audiences. NOAA's science and services in climate, weather and water are increasingly important to U.S. businesses' operations and planning, local decision-making, and individual livelihoods, therefore NOAA must ensure wider access, understanding, and use of this information to contribute to a better informed and more equitable society that is better prepared for a changing climate.

These funds would put the NOAA Communications capacity on par with that of other Federal science agencies, and directly supports NOAA's mission of sharing scientific knowledge, data and services with the public. As the agency produces more science, demands for NOAA's products, services, and expertise steadily increase, including from media and constituents. Yet NOAA Communications has not received an operational funding increase since the early 1990s, limiting our capacity to fully share the value of the Agency's work.

These resources would also provide an opportunity for more targeted outreach to underserved communities and underrepresented groups, who are more likely to be unaware of, or unable to, access NOAA data and services. This initiative will allow for hiring specialists with secondary language proficiencies to enhance outreach capabilities to more communities. This will allow for enhanced communications about NOAA products that can help those communities that are disproportionately affected by extreme weather and other hazards of climate change better understand vulnerabilities and take appropriate action. In sum, this request enables the Office of Communications to implement a strategy, using traditional and new media platforms, to educate and build awareness among diverse and multi-sector decision-makers, community members, and stakeholders.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022-2026

- Create an external affairs team in order to develop strategy and execute outreach to more diverse communities
- Create a new three-person public affairs team devoted to communicating NOAA's climate science and services through innovative local, regional and national media outreach
- Focus on hiring specialists with secondary language proficiencies to enhance NOAA's outreach capacity
- Contract outside survey of community leaders in underserved communities to understand their needs accessing and using NOAA data and services
- Double the size of the digital team and develop user-focused strategies for reaching underserved populations with NOAA's online information

Deliverables:

- Toolkit for stakeholders and the media to reach underserved communities to understand and take advantage of climate services
- Media products in other languages, focusing initially on Spanish and ASL interpretation
- Survey of local leaders in underserved communities to receive feedback on how NOAA can improve and more equitably communicate the agency's data, science and services

Performance Measures	2022	2023	2024	2025	2026
Number of underserved communities surveyed					
With Increase	50	50	50	50	50
Without Increase	0	0	0	0	0

Performance Measures	2022	2023	2024	2025	2026
Toolkits distributed to communities / media					

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

With Increase	40	40	40	40	40
Without Increase	0	40	40	40	40
Outyear Costs:					
Direct Obligations	2,000				
Capitalized	0	0	0	0	0
Uncapitalized	2,000				
	2,000	2,000	2,000	2,000	
Budget Authority	2,000				
Outlays	1,240 2,000	1,240 2,000	1,240 2,000	1,240 2,000	
FTE	7	9	9	9	9
Positions	9 2,000	9 2,000	9 2,000	9 2,000	9
				1,240	

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Executive Leadership
Subactivity: Executive Leadership
Program Change: Strategic Communication and Outreach to Underserved Communities

Title		Grade	Number	Annual Salary	Total Salaries
Deputy Director of External Affairs		ZA-IV	1	140,000	140,000
External Affairs Specialist		ZA-III	1	100,000	100,000
Digital Content Manager		ZA-III	1	100,000	100,000
Digital Content Writer-editor		ZA-III	1	80,000	80,000
Public Affairs Specialist		ZA-IV	3	120,000	360,000
Public Affairs Specialist		ZA-III	2	100,000	200,000
Total			9		980,000
Less lapse	25.00%		(2)		(245,000)
Total full-time permanent (FTE)			7		735,000
2022 Pay Adjustment (2.7%)					19,845
					754,845

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	7
Total FTE	7
Authorized Positions:	
Full-time permanent	9
Total Positions	9

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Executive Leadership
Subactivity: Executive Leadership

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	13,691	14,803	15,165	15,920	755
11.3	Other than full-time permanent	350	350	350	350	0
11.5	Other personnel compensation	717	700	700	700	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	14,758	15,853	16,215	16,970	755
12	Civilian personnel benefits	5,655	6,000	6,708	6,935	227
13	Benefits for former personnel	6	6	6	6	0
21	Travel and transportation of persons	385	300	300	350	50
22	Transportation of things	8	8	8	18	10
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	2,294	2,000	2,079	2,179	100
23.2	Rental Payments to others	1,472	1,000	1,000	1,000	0
23.3	Communications, utilities and misc charges	288	200	400	400	0
24	Printing and reproduction	7	7	7	7	0
25.1	Advisory and assistance services	766	500	500	500	0
25.2	Other services from non-Federal sources	1,033	800	846	1,654	808
25.3	Other goods and services from Federal sources	158	100	100	100	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	209	100	105	130	25
31	Equipment	136	100	102	127	25
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	293	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	1	1	1	0
44	Refunds	0	0	0	0	0
99	Total obligations	27,469	26,975	28,377	30,377	2,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Mission Services and Management	Pos./BA	625	161,141	638	163,671	13	2,530
	FTE/OBL	594	161,141	604	163,671	10	2,530

Acquisition and Grants Office (+$2,530, 10 FTE/13 Positions) – The Acquisition and Grants Office (AGO) will utilize additional funds to build acquisition and grant management capacity through increased staffing. AGO provides high-value services to NOAA Line and Staff Offices, compliant with laws and regulations and at the best value to the government through the planning, solicitation, award, administration, and closeout of nearly 23,000 acquisition and financial assistance transactions annually. NOAA's ability to accomplish its mission and achieve its goals depends significantly on AGO's ability to process over $3 billion annually in accordance with statutory and regulatory requirements. AGO is a critical partner to other NOAA offices working to create and foster natural and economic resilience along our coasts through direct financial support, expertise and robust, on-the-ground partnerships and place-based conservation activities. Ecological restoration and community resilience, as outlined in EO 14008, are integral to NOAA and the Administration's climate strategy.

While AGO's fee for service model would fund the majority of new acquisition work related to the Administration's priorities for climate research, space weather operations, fleet support, and satellites, additional appropriations are needed to address the anticipated increases in grants and associated inherently governmental management and oversight functions, including staffing. The new positions are anticipated to be directly related to financial assistance execution and increased management responsibilities under expanded programs. The anticipated increase in financial assistance funds in FY 2022 represents a 25 percent increase in workload for the Grants Management Division over the past three years.

Without the requested increase for personnel, AGO's capacity to process and manage new grants would not be able to keep up with the volume of activity proposed in FY 2022. Delays in grant awards will lead to increased carryover balances across NOAA and could jeopardize NOAA's ability to realize the Administration's climate priorities. Furthermore, without increased funding, AGO may not be able to diligently monitor those grants it does award to ensure good performance and proper financial stewardship.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

There is an increasing need for NOAA to create and foster natural and economic resilience along our coasts through support, expertise and robust, on-the-ground partnerships and place-based conservation activities. Ecological restoration and community resilience, as outlined in EO 14008, are integral to NOAA and the Administration's climate strategy.

Schedule and Milestones:
FY 2022-2026:

- FY 2022 Pre-Award Phase: Planning and partnership with prospective grantees and developing funding opportunities
- FY 2022 - FY 2023 Award Phase: Awarding grants funds
- FY 2023 - FY 2026 Post-Award Phase: Monitoring, reporting progress, and closeout

Deliverables:

- New grants awarded are managed timely and accordance with all required oversight

	2022	2023	2024	2025	2026
Outyear Costs:					
Direct Obligations	2,530	2,530	2,530	2,530	2,530
Capitalized	0	0	0	0	0
Uncapitalized	2,530	2,530	2,530	2,530	2,530
Budget Authority	2,530	2,530	2,530	2,530	2,530
Outlays	1,569	1,569	1,569	1,569	1,569
FTE	10	13	13	13	13
Positions	13	13	13	13	13

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Mission Services and Management
Subactivity: Mission Services and Management
Program Change: Acquisition and Grants Office

Title		Grade	Number	Annual Salary	Total Salaries
Grants Management Specialist		14	6	159,286	955,716
Grants Management Specialist		13	4	134,798	539,192
Management Analyst		14	2	159,286	318,572
Management Analyst		13	1	134,798	134,798
Total			13		1,948,278
Less lapse	25.00%		(3)		(487,070)
Total full-time permanent (FTE)			10		1,461,209
2022 Pay Adjustment (2.7%)					39,453
					1,500,661

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	10
Total FTE	10
Authorized Positions:	
Full-time permanent	13
Total Positions	13

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Mission Services and Management
Subactivity: Mission Services and Management

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	62,430	69,441	70,990	72,491	1,501
11.3	Other than full-time permanent	338	338	338	338	0
11.5	Other personnel compensation	1,944	1,945	1,944	1,997	53
11.7	Miltary personnel compenstation	515	661	0	0	0
11.9	Total personnel compensation	65,227	72,385	73,272	74,826	1,554
12	Civilian personnel benefits	20,609	22,923	25,421	25,916	495
13	Benefits for former personnel	53	52	52	52	0
21	Travel and transportation of persons	471	459	459	693	234
22	Transportation of things	149	145	149	149	0
23	Rent, communications, and utilitites	0	0	0	13	13
23.1	Rental payments to GSA	5,860	5,716	5,749	5,871	122
23.2	Rental Payments to others	683	666	666	666	0
23.3	Communications, utilities and misc charges	930	907	1,407	1,410	3
24	Printing and reproduction	379	370	376	376	0
25.1	Advisory and assistance services	19,162	18,691	18,791	18,791	0
25.2	Other services from non-Federal sources	23,529	17,698	18,918	18,930	12
25.3	Other goods and services from Federal sources	11,189	10,914	14,018	14,018	0
25.4	Operation and maintenance of facilities	0	0	0	16	16
25.5	Research and development contracts	0	0	0	20	20
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	17	17
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	554	540	553	571	18
31	Equipment	1,216	1,186	1,207	1,233	26
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	89	87	87	87	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	16	16	16	16	0
44	Refunds	0	0	0	0	0
99	Total obligations	150,116	152,755	161,141	163,671	2,530

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Mission Services and Management	Pos./BA	625	161,141	649	166,141	24	5,000
	FTE/OBL	594	161,141	612	166,141	18	5,000

Increase Facility Program Capacity (+$5,000, 18 FTE/24 Positions) – NOAA requests funds to build capacity within the Office of the Chief Administrative Officer (OCAO) to coordinate capital investment, sustainment, and deferred maintenance and repair (DM&R) activities supported by NOAA's Facilities Maintenance (ORF) and Construction (PAC) accounts. In addition funds will support the NOAA Strategic Facilities Plan and other facility planning efforts. NOAA's facilities portfolio supports scientific programs throughout the United States ranging programmatically from climate, weather, ocean, and fisheries research and services, to operational facilities supporting multi-billion-dollar satellite programs and NOAA's ship and aircraft operations. NOAA values its inventory at over $3 billion. This increased capacity will provide support to address an increasing number of requests for capital investment projects and a growing backlog of DM&R projects. Additional staff will provide project definition and development of business cases, alternative analyses, and new project plans.

Additional staff are also needed to properly manage NOAA's facilities Asset Management Program, planning requirements including a thorough capture of requirements for project planning, the development of realistic cost estimates, and proper definition of project scope. OCAO must also maintain project oversight which includes review of designs/reports and monitoring construction work in progress. This program will also increase capacity within other divisions of OCAO such as audit and information support, real property management, and personal property and fleet management as NOAA implements the new Business Application System interface with Sunflower and other platforms starting in FY 2022.

OCAO is diligent about initiating activities cited in appropriations and deferred maintenance priorities, however, during COVID-19, project execution slowed due to staffing, supply chain shortages, and travel restriction issues. Significant project management and engineering expertise is needed to right-size NOAA's facility footprint, achieve NOAA's climate change goals, spur economic growth, create good paying jobs, and serve marginalized and overburdened communities. NOAA has a fiduciary responsibility for the stewardship of these assets to ensure the NOAA facility footprint aligns with NOAA mission needs in the most cost-effective manner.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:

Q1 FY 2022

- Award contract to develop National Capital Region Program of Requirements

Draft ver. 1 NOAA Facilities Strategic Plan incorporating all coastal regions Q2 FY 2022

- Award of New Hampshire Business Case Analysis
- Complete construction of Phase 1 SSMC Consolidation
- Award design of Phase 2 SSMC Consolidation

Q3 FY 2022

- Award demolition contract of Mukilteo
- Award Program of Requirements National Capital Region

Q4 FY 2022

- Complete the Program of Requirements Seattle Region
- Award the construction of Charleston Pier Design and Buildout
- Award of Seattle / Western Region Business Case Analysis
- Preliminary planning for Seattle Design

Deliverables:

- National Strategic Facilities Plan
- Annual process to update the National Strategic Facilities Plan
- Two - three Regional Business Case Analyses providing integration (visibility) across planning activities
- Annual Prioritized Deferred Maintenance and Repair (DM&R) List
- Annual Prioritized List of Capital Investment Projects

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Percentage of DM&R projects awarded throughout NOAA					
With Increase	80	80	80	80	80
Without Increase	65	65	65	65	65
Out-year Costs:					
Direct Obligations	5,000	5,000	5,000	5,000	5,000
Capitalized	0	0	0	0	0
Uncapitalized	5,000				
Budget Authority	5,000				
Outlays	3,100 5,000	3,100 5,000	3,100 5,000	3,100 5,000	
FTE	18	24	24	24	24
Positions	24 5,000	24 5,000	24 5,000	24 5,000	24
				3,100	

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Mission Support and Management
Subactivity: Mission Support and Management
Program Change: Increase Facility Program Capacity

Title		Pay Band	Number	Annual Salary	Total Salaries
Management Analyst		ZA-IV	6	150,000	900,000
Realty Specialist		ZA-III	2	120,000	240,000
Financial Management Specialist		ZA-III	3	132,000	396,000
Logistics Management Specialist		ZA-III	3	125,000	375,000
Environmental Engineer		ZP-IV	3	147,000	441,000
Engineer		ZP-IV	4	157,000	628,000
Engineering Technician		ZP-III	3	132,000	396,000
Total			24		3,376,000
Less lapse	25.00%		(6)		(844,000)
Total full-time permanent (FTE)			18		2,532,000
2022 Pay Adjustment (2.7%)					68,364
					2,600,364

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	18
Total FTE	18
Authorized Positions:	
Full-time permanent	24
Total Positions	24

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Mission Services and Management
Subactivity: Mission Services and Management

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	62,430	69,441	70,990	73,590	2,600
11.3	Other than full-time permanent	338	338	338	338	0
11.5	Other personnel compensation	1,944	1,945	1,944	1,944	0
11.7	Miltary personnel compensation	515	661	0	0	0
11.9	Total personnel compensation	65,227	72,385	73,272	75,872	2,600
12	Civilian personnel benefits	20,609	22,923	25,421	26,201	780
13	Benefits for former personnel	53	52	52	52	0
21	Travel and transportation of persons	471	459	459	459	0
22	Transportation of things	149	145	149	149	0
23	Rent, communications, and utilities	0	0	0	0	0
23.1	Rental payments to GSA	5,860	5,716	5,749	5,749	0
23.2	Rental Payments to others	683	666	666	666	0
23.3	Communications, utilities and misc charges	930	907	1,407	1,407	0
24	Printing and reproduction	379	370	376	376	0
25.1	Advisory and assistance services	19,162	18,691	18,791	20,411	1,620
25.2	Other services from non-Federal sources	23,529	17,698	18,918	18,918	0
25.3	Other goods and services from Federal sources	11,189	10,914	14,018	14,018	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	554	540	553	553	0
31	Equipment	1,216	1,186	1,207	1,207	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	89	87	87	87	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	16	16	16	16	0
44	Refunds	0	0	0	0	0
99	Total obligations	150,116	152,755	161,141	166,141	5,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Mission Services and Management	Pos./BA	625	161,141	625	162,541	0	1,400
	FTE/OBL	594	161,141	594	162,541	0	1,400

Implement a Budget Position Management System (+$1,400, 0 FTE/0 Positions) - NOAA's management of positions, labor costs, vacancies and lapse is critical to a well-managed organization and for the responsible shepherding of taxpayer dollars. NOAA does not have a system of record that tracks positions by budget line so reporting must be done through manual data calls to the Line and Staff Offices, and NOAA has struggled to validate the reported data. This lack of data integrity is an increasing enterprise risk, especially as NOAA transitions to an enterprise-model for both Talent Acquisition and the new Business Application System. Implementing a budget position management system will improve NOAA's ability to report the required data and be directly responsive to Congressional directives in recent years to improve NOAA's position management capabilities. The establishment of transparent linkage between positions and budget is a necessary component for oversight and interoperability to continuously improve the provision of human capital services, most importantly the hiring process, across NOAA. Finally, the implementation of such a system would also free Office of Human Capital Services HR specialists to focus on the broad range of human capital consultative services including workforce planning, precise development of budgets per personnel counts, and tailored career progression and succession planning. Ultimately, NOAA's lack of a budget position management system hinders its ability to develop, budget for, and execute a comprehensive human capital strategy and vision for the future of its workforce.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022-2026

- Establish and implement a streamlined, standardized process for collecting and reporting NOAA staffing and associated budget , filled and unfilled positions
- Identify recommendations to enable and maximize automation of the standardized process
- Maintain effective data quality and data cleanup activities for successful data management

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

- Identify opportunities and methods to enhance communications, transparency and clarity regarding on-going reporting needs and coordination with the Enterprise-level service provider

Deliverables:

- Standardized process for collecting personnel data
- Accurate budget and organizational data across NOAA
- Integration between NOAA's HR and new financial systems
- Business Rules and Interagency Agreements
- Process for data collection, analyses, and cleanup in order to maintain data quality

Performance Measures	2022	2023	2024	2025	2026
With Increase	90	92	94	96	100
Without Increase	80	80	80	80	80
Outyear Costs:					
Direct Obligations	1,400	1,400	1,400	1,400	1,400
Capitalized	1,400	1,400	1,400	1,400	1,400
Uncapitalized	0	0	0	0	0
Budget Authority	1,400	1,400	1,400	1,400	1,400
Outlays	868	868	868	868	868
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Mission Services and Management
Subactivity: Mission Services and Management

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	62,430	69,441	70,990	70,990	0
11.3	Other than full-time permanent	338	338	338	338	0
11.5	Other personnel compensation	1,944	1,945	1,944	1,944	0
11.7	Miltary personnel compensation	515	661	0	0	0
11.9	Total personnel compensation	65,227	72,385	73,272	73,272	0
12	Civilian personnel benefits	20,609	22,923	25,421	25,421	0
13	Benefits for former personnel	53	52	52	52	0
21	Travel and transportation of persons	471	459	459	459	0
22	Transportation of things	149	145	149	149	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	5,860	5,716	5,749	5,749	0
23.2	Rental Payments to others	683	666	666	666	0
23.3	Communications, utilities and misc charges	930	907	1,407	1,407	0
24	Printing and reproduction	379	370	376	376	0
25.1	Advisory and assistance services	19,162	18,691	18,791	18,791	0
25.2	Other services from non-Federal sources	23,529	17,698	18,918	20,318	1,400
25.3	Other goods and services from Federal sources	11,189	10,914	14,018	14,018	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	554	540	553	553	0
31	Equipment	1,216	1,186	1,207	1,207	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	89	87	87	87	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	16	16	16	16	0
44	Refunds	0	0	0	0	0
99	Total obligations	150,116	152,755	161,141	162,541	1,400

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Mission Services and Management	Pos./BA	625	161,141	625	162,041	0	900
	FTE/OBL	594	161,141	594	162,041	0	900

Equity Assessment and Implementation Support In Compliance with EO 13985 (+$900, 0 FTE/0 Positions) - EO 13985, Section 5 tasks Federal agencies to conduct Service Equity Assessments which are a review of selected high-priority programs for an assessment of whether underserved communities face systemic barriers to access benefits and opportunities available pursuant to those programs. The EO also asks agencies to produce a plan for addressing these barriers to ensure full and equal participation in the selected programs. With these requested funds, NOAA will expand the number of assessments of NOAA's programs and services and learn, through the statistical collection of evidence, which plans are effective in addressing barriers. In this way, it will be possible to quickly incorporate lessons learned and institutionalize an efficient strategy for equitable service delivery at NOAA.

The Performance, Risk and Social Science Office (PRSSO) will work with NOAA programs selected for the Service Equity Assessment to evaluate the barriers to equitable deployment of NOAA's services and employ strategies to overcome these barriers. These strategies will include evidence-based evaluations of processes and program outcomes and best practices from customer experience (CX) approaches, including service blueprinting and journey mapping. For example, large-scale weather, water, and climate events have caused a striking $1.875 trillion in economic damages since 1980, and they have disproportionately affected the lives of vulnerable populations. In many localities whose budgets have already been constrained by the pandemic, major storms have caused local revenues to fall by six to seven percent, with that figure two times larger for municipalities with a significant racial-minority population. To counteract impacts such as this one, it is crucial that NOAA assess and improve the delivery of its programs to mitigate for increased adverse impacts for underserved communities.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

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Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Schedule and Milestones:

FY 2022-2026

- Create a database of underserved communities and equity barriers identified through the Service Equity Assessments
- Conduct up to three evaluations of plans to address barriers, or other assessments of service delivery of high-impact programs, in FY 2022-2023
- Develop a CX model focusing on underserved communities and apply it to selected high-impact programs:
    - Collect existing documentation about each program's mission, communities served, and operating model
    - Conduct interviews with selected communities to gain qualitative insights into the programs' service delivery models, customer experience, and pain points
    - Map communities/stakeholder landscape using existing documentation and interviews
    - Develop a community/stakeholder ecosystem map to facilitate Community Network Analysis based on existing data
    - Conduct Community Network Analysis to identify key relationships between communities and NOAA programs based on existing data
    - Conduct focus groups with employees and stakeholders from diverse underserved populations (e.g., rural, communities of color. tribal, etc.) to gain qualitative insights into service delivery models, customer experience, and pain points
- Conduct subsequent evaluations of the effectiveness of the CX model for integrating the information in the NOAA decision making process in FY 2023-2026

Deliverables:

- Database representing NOAA's services and alignment with underserved communities, and proposed barriers to access
- Action plans to address access barriers and reports on incorporating lessons learned into other NOAA programs
- CX model to inform future evaluations

Performance Measures	2022	2023	2024	2025	2026

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Number of Equity Barrier Plans and Designs of					
With Increase	2	2	2	2	2
Without Increase	0	0	0	0	0
Number of High Impact Programs with Improved					
With Increase	1	2	2	2	2
Without Increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	900	900	900	900	900
Capitalized	0	0	0	0	0
Uncapitalized	900	900	900	900	900
Budget Authority	900	900	900	900	900
Outlays	558	558	558	558	558
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Mission Services and Management
Subactivity: Mission Services and Management

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	62,430	69,441	70,990	70,990	0
11.3	Other than full-time permanent	338	338	338	338	0
11.5	Other personnel compensation	1,944	1,945	1,944	1,944	0
11.7	Military Personnel compensation	515	661	0	0	0
11.9	Total personnel compensation	65,227	72,385	73,272	73,272	0
12	Civilian personnel benefits	20,609	22,923	25,421	25,421	0
13	Benefits for former personnel	53	52	52	52	0
21	Travel and transportation of persons	471	459	459	459	0
22	Transportation of things	149	145	149	149	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	5,860	5,716	5,749	5,749	0
23.2	Rental Payments to others	683	666	666	666	0
23.3	Communications, utilities and misc charges	930	907	1,407	1,407	0
24	Printing and reproduction	379	370	376	376	0
25.1	Advisory and assistance services	19,162	18,691	18,791	18,791	0
25.2	Other services from non-Federal sources	23,529	17,698	18,918	18,918	0
25.3	Other goods and services from Federal sources	11,189	10,914	14,018	14,918	900
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	554	540	553	553	0
31	Equipment	1,216	1,186	1,207	1,207	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	89	87	87	87	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	16	16	16	16	0
44	Refunds	0	0	0	0	0
99	Total obligations	150,116	152,755	161,141	162,041	900

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Mission Services and Management	Pos./BA	625	161,141	632	161,941	7	800
	FTE/OBL	594	161,141	599	161,941	5	800

NOAA Finance Transaction Processing (+$800, 5 FTE/7 Positions) - Additional funds will be used to support staff to ensure successful processing and appropriate oversight of financial transactions associated with the additional appropriated resources requested in the FY 2022 President's Budget.

NOAA Finance supports the NOAA mission by processing financial transactions such as payments to vendors, collections of fees, support of loan programs, and billing and payment of reimbursable agreements with partner agencies and the private sector. At the current level of funding, NOAA Finance typically processes over 100,000 invoices valued at approximately $1.7 billion. Invoices must be processed within 30 days of receipts or interest will accrue. Given the proposed increases in ORF and PAC funding (22 percent and 45 percent, respectively, over current year funding), the number of transactions are likely to increase significantly. Additional staff will improve NOAA's capacity to ensure timely processing of transactions and avoid interest penalties.

Additionally, financial oversight, reporting, and audit activities will be required to support this increased level of funding for NOAA. The significant increase in PAC funding directly translates to capitalized property which requires specialized financial policy support, oversight, and reporting. Additional staff will support the NOAA Finance Office in reviewing internal controls, supporting external audit requests and analysis, and providing financial policy guidance and reporting related to the increase in funding level.

While the Finance Office may not be carrying out NOAA's mission in the field, it directly supports those who do by ensuring the appropriate and timely financial transactions to make that work possible. This includes critical restoration and resilience priorities integral to the Administration's climate strategy.

There is an increasing need for NOAA to create and foster natural and economic resilience along our coasts through direct financial support, expertise and robust, on-the-ground partnerships and place-based conservation activities. Ecological restoration and community resilience, as outlined in EO 14008, are integral to NOAA and the Administration's climate strategy.

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022 - 2026
- Hire and train additional staff

Deliverables:
- Financial transactions that are processed timely and accurately
- Policy and analysis related to additional capitalized assets
- Complete deliverables for financial statement audit
- Financial oversight of additional funding in internal control reviews

	2022	2023	2024	2025	2026
Direct Obligations	800	800	800	800	800
Capitalized	0	0	0	0	0
Uncapitalized	800	800	800	800	800
Budget Authority	800	800	800	800	800
Outlays	496	496	496	496	496
FTE	5	7	7	7	7
Positions	7	7	7	7	7

Exhibit 14

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Mission Services and Management
Subactivity: Mission Services and Management
Program Change: NOAA Finance Transaction Processing

Title		Grade	Number	Annual Salary	Total Salaries
Auditor		ZA-III	1	100,000	100,000
Accountant		ZA-II	1	80,000	80,000
Accountant		ZA-III	1	100,000	100,000
Financial Management Specialist		ZA-II	4	77,000	308,000
Total			7		588,000
Less lapse	25.00%		(2)		(147,000)
Total full-time permanent (FTE)			5		441,000
2022 Pay Adjustment (2.7%)					11,907
					452,907

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	5
Total FTE	5
Authorized Positions:	
Full-time permanent	7
Total Positions	7

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Mission Services and Management
Subactivity: Mission Services and Management

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	62,430	69,441	70,990	71,443	453
11.3	Other than full-time permanent	338	338	338	338	0
11.5	Other personnel compensation	1,944	1,945	1,944	1,944	0
11.7	Military personnel compensation	515	661	0	0	0
11.9	Total personnel compensation	65,227	72,385	73,272	73,725	453
12	Civilian personnel benefits	20,609	22,923	25,421	25,557	136
13	Benefits for former personnel	53	52	52	52	0
21	Travel and transportation of persons	471	459	459	459	0
22	Transportation of things	149	145	149	149	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	5,860	5,716	5,749	5,749	0
23.2	Rental Payments to others	683	666	666	666	0
23.3	Communications, utilities and misc charges	930	907	1,407	1,407	0
24	Printing and reproduction	379	370	376	376	0
25.1	Advisory and assistance services	19,162	18,691	18,791	18,791	0
25.2	Other services from non-Federal sources	23,529	17,698	18,918	19,094	176
25.3	Other goods and services from Federal sources	11,189	10,914	14,018	14,018	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	554	540	553	567	14
31	Equipment	1,216	1,186	1,207	1,228	21
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	89	87	87	87	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	16	16	16	16	0
44	Refunds	0	0	0	0	0
99	Total obligations	150,116	152,755	161,141	161,941	800

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Mission Services and Management	Pos./BA	625	161,141	629	164,441	4	3,300
	FTE/OBL	594	161,141	597	164,441	3	3,300

NOAA Open Data Dissemination (+$3,300, 3 FTE/4 Positions) – Funds requested will evolve NOAA's proven, cost-effective Big Data Program into an Enterprise-wide Service, NOAA Open Data Dissemination (NODD). NODD will provide worldwide cloud access to all of NOAA's rapidly increasing open data, including climate data and other Earth System dynamics crucial to improve climate modeling. NODD allows for enhanced collaboration and creation of new business opportunities, while also aligning with Executive Order 14008 and supporting the advancement of environmental justice and improved local and community decision making by democratizing access to data. NODD also enables new access to NOAA data that was previously difficult to obtain, such as non-confidential, acoustical fisheries data archives that provide deep insight into the Nation's fisheries. Users access data outside the security boundary, which eliminates obstacles and improves access while avoiding future IT infrastructure costs and improving NOAA's cybersecurity posture.

NOAA has developed low cost, public-private partnerships with commercial cloud service providers (CSPs) that provide for a minimum of 15 petabytes in free storage; provide free public egress for all data from NODD or other Line Office (LO) storage contracts with the CSPs; allow for integration of NOAA data into existing cloud-based access and analytical tools and with other datasets on the CSP platforms; and provide a feasible dissemination model for other Federal agencies with open data. NOAA's Cooperative Institute for Satellite Earth System Studies in North Carolina serves as the Trusted Data Broker, coordinating secure data deliveries from NOAA to the CSPs; and researches, develops and implements technical solutions, data usage analytics, and User Engagement adoption efforts that provide a feedback loop on both dataset delivery and user needs. Full funding of this initiative will support new staff who can provide dedicated engagement, technical, and business coordination, Cooperative Institute grants, and contract funding to support LOs in quickly enabling solutions for open data requirements. Without requested funding, gaps in data availability will result in lost user confidence in NODD; CSPs are less likely to renew the contracts; dissemination costs will continue to erode mission investment; and users will continue the struggle to find and access NOAA's environmental, oceanographic, weather, and climate related data.

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(Dollar amounts in thousands)

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022-2026

- Complete NOAA Operational Model Archive & Distribution System (NOMADS) via NODD Pilot Phase I -- Sep 2021
- Award renewals of CSP (3) contracts (1st Option year) -- (2) Sep 2021 & (1) Dec 2021
- Complete NOMADS Pilot Phase II -- Jan 2022
- Hire permanent NODD staff -- Mar 2022
- Develop and implement dashboards for real-time statistics -- Jun 2022
- Continue uploading data to NOAA CSP Allocations -- Oct 2021-Sep 2022

Deliverables:

- User or CSP requested datasets
- Targeted Climate datasets and related products to support EO 14008 and environmental justice
- CSP open dataset catalog information to enable NOAA public data discovery
- Statistics and metrics to monitor data set usage (volume, accession, etc.)
- Approaches to ensure end-to-end data integrity
- Backfill near real time cloud holdings with complete period of record holdings for select NOAA archive datasets
- Conversion to cloud optimized formats for select datasets
- Software to monitor data transfers, detect failures, determine mitigation, re-spawn processes as needed
- User Engagement activities with CSPs and LOs to encourage transition to NODD, provide insight into user needs

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National Oceanic and Atmospheric Administration
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(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Annual Percentage Increase in Datasets					
With Increase	10	20	20	30	30
Without Increase	1	1	1	1	1
Monitoring System Status Frequency					
With Increase	Weekly	Weekly	Weekly	Weekly	Weekly
Without Increase	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly
User Engagement with NOAA LOs and Cloud Service Providers					
With Increase	8	12	16	20	24
Without Increase	1	1	1	1	1
Outyear Costs:					
Direct Obligations	3,300	3,300	3,300	3,300	3,300
Capitalized	0	0	0	0	0
Uncapitalized	3,300	3,300	3,300	3,300	3,300
Budget Authority	3,300	3,300	3,300	3,300	3,300
Outlays	2,046	2,046	2,046	2,046	2,046
FTE	3	4	4	4	4
Positions	4	4	4	4	4

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Mission Services and Management
Subactivity: Mission Services and Management
Program Change: NOAA Open Data Dissemination

Title		Grade	Number	Annual Salary	Total Salaries
Strategy and Engagement Director		ZP-V	1	172,500	172,500
Technical Innovation Director		ZA-V	1	172,500	172,500
Program Manager		ZP-IV	1	168,987	168,987
Communications Lead		ZA-IV	1	168,987	168,987
					0
Total			4		682,974
Less lapse	25.00%		(1)		(170,744)
Total full-time permanent (FTE)			3		512,231
2022 Pay Adjustment (2.7%)					13,830
					526,061

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	3
Total FTE	3
Authorized Positions:	
Full-time permanent	4
Total Positions	4

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Mission Services and Management
Subactivity: Mission Services and Management

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	62,430	69,441	70,990	71,516	526
11.3	Other than full-time permanent	338	338	338	338	0
11.5	Other personnel compensation	1,944	1,945	1,944	1,944	0
11.7	Military personnel compsation	515	661	0	0	0
11.9	Total personnel compensation	65,227	72,385	73,272	73,798	526
12	Civilian personnel benefits	20,609	22,923	25,421	25,579	158
13	Benefits for former personnel	53	52	52	52	0
21	Travel and transportation of persons	471	459	459	609	150
22	Transportation of things	149	145	149	149	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	5,860	5,716	5,749	5,749	0
23.2	Rental Payments to others	683	666	666	666	0
23.3	Communications, utilities and misc charges	930	907	1,407	1,407	0
24	Printing and reproduction	379	370	376	376	0
25.1	Advisory and assistance services	19,162	18,691	18,791	18,791	0
25.2	Other services from non-Federal sources	23,529	17,698	18,918	20,184	1,266
25.3	Other goods and services from Federal sources	11,189	10,914	14,018	14,018	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	554	540	553	553	0
31	Equipment	1,216	1,186	1,207	1,207	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	89	87	87	1,287	1,200
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	16	16	16	16	0
44	Refunds	0	0	0	0	0
99	Total obligations	150,116	152,755	161,141	164,441	3,300

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Mission Services and Management	Pos./BA	625	161,141	626	163,641	1	2,500
	FTE/OBL	594	161,141	595	163,641	1	2,500

NOAA Cloud Program (+$2,500, 1 FTE/1 Positions) – This request establishes a NOAA Enterprise Cloud Program Office to streamline and accelerate the transition of NOAA mission areas to the cloud and access to innovative cloud inherent technologies. The program will deliver comprehensive multi-cloud services, avoiding the need for duplication of effort across NOAA in the following areas: acquisition support, networking, cybersecurity, authentication services, cloud subject matter expertise, and customer advocacy. The program will provide coordination for multi-cloud services through a dedicated project manager that will facilitate cloud onboarding. The program will bring in expertise from the NOAA Open Data Dissemination (the evolution of NOAA's Big Data Program) and High Performance Computing Program, and cloud architects. The program will ensure comprehensive security and networking to deliver a complete solution that meets customer requirements. Through the utilization of innovative cloud technologies, NOAA's Enterprise Cloud Program further promotes the national priorities of Data Democratization, Climate Science and Quality of Science, Technology & Data Integrity.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022-2026

- Establish Security Boundary for cloud services
- Update NOAA Cloud Committee Terms of Reference
- Develop Cloud Service Portal (Intranet)
- Transition Cloud Service Desk to ServiceNow
- Update Enterprise Cloud Standard Operating Procedures
- Implement mandatory controls for major providers

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

- Authentication service implementation for major providers
- Cloud Onboarding Process in ServiceNow
- Cloud Concept of Operations review and update
- Develop a NOAA Cloud Workshop

Deliverables:

- Dashboard for customers to track cloud onboarding requests
- Establish a cloud test environment with security guardrails for R&D
- Architectural model for delivering network, authentication, security and billing for cloud services
- Governance structure for delivering the shared services of network, billing/contracts, authentication services and IT security
- Cloud portal to disseminate information

Performance Measures	2022	2023	2024	2025	2026
Cloud Infrastructure as a Service Onboarding Time (Avg)					
With Increase	90 days	60 days	60 days	60 days	60 days
Without Increase	180 days	180 days	180 days	180 days	180 days
Software as a Service Approval Time (Avg)					
With Increase	60 days	45 days	45 days	45 days	45 days
Without Increase	240 days	240 days	240 days	240 days	240 days
Customer Experience					
With Increase	75%				
Without Increase	0%	0%	0%	0%	0%
	80%	85%	85%	85%	

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

User Engagement with NOAA LOs & Cloud Service Providers					
With Increase	8	12	16	20	20
Without Increase	1	1	1	1	1
Outyear Costs:					
Direct Obligations	2,500	2,500	2,500	2,500	2,500
Capitalized	0	0	0	0	0
Uncapitalized	2,500				
Budget Authority	2,500				
Outlays	1,550 2,500	1,550 2,500	1,550 2,500	1,550 2,500	
FTE	1	1	1	1	1
Positions	1 2,500	1 2,500	1 2,500	1 2,500	1
				1,550	

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PROGRAM CHANGE PERSONNEL DETAIL

Activity: Mission Services and Management
Subactivity: Mission Services and Management
Program Change: NOAA Cloud Program

Title		Grade	Number	Annual Salary	Total Salaries
Program Manager		ZP-IV	1	168,987	168,987
					0
					0
Total			1		168,987
Less lapse	25.00%		(0)		(42,247)
Total full-time permanent (FTE)			1		126,740
2022 Pay Adjustment (2.7%)					3,422
					130,162

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	1
Total FTE	1
Authorized Positions:	
Full-time permanent	1
Total Positions	1

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Mission Services and Management
Subactivity: Mission Services and Management

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	62,430	69,441	70,990	71,120	130
11.3	Other than full-time permanent	338	338	338	338	0
11.5	Other personnel compensation	1,944	1,945	1,944	1,944	0
11.7	Miltary personnel compensation	515	661	0	0	0
11.9	Total personnel compensation	65,227	72,385	73,272	73,402	130
12	Civilian personnel benefits	20,609	22,923	25,421	25,460	39
13	Benefits for former personnel	53	52	52	52	0
21	Travel and transportation of persons	471	459	459	459	0
22	Transportation of things	149	145	149	149	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	5,860	5,716	5,749	5,749	0
23.2	Rental Payments to others	683	666	666	666	0
23.3	Communications, utilities and misc charges	930	907	1,407	1,407	0
24	Printing and reproduction	379	370	376	376	0
25.1	Advisory and assistance services	19,162	18,691	18,791	18,791	0
25.2	Other services from non-Federal sources	23,529	17,698	18,918	21,249	2,331
25.3	Other goods and services from Federal sources	11,189	10,914	14,018	14,018	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	554	540	553	553	0
31	Equipment	1,216	1,186	1,207	1,207	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	89	87	87	87	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	16	16	16	16	0
44	Refunds	0	0	0	0	0
99	Total obligations	150,116	152,755	161,141	163,641	2,500

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase/Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Mission Services and Management	Pos./BA	625	161,141	627	162,911	2	1,770
	FTE/OBL	594	161,141	596	162,911	2	1,770

Enterprise Infrastructure Solution (EIS) (+$1,770, 2 FTE/2 Positions) – This increase will enable NOAA to conduct a technology modernization and support an accelerated transition of telecommunications services to the GSA EIS contract vehicle. DOC currently uses GSA's Networx, Washington Interagency Telecommunications System 3, and regional contracts to acquire telecommunication services. These contracts expire in May 2023. Between now and then, DOC will be transitioning telecommunications services to the GSA EIS follow-on contract. Additional EIS requests can also be found in NOS (NOS-48, NOS-88, NOS-120, and NOS-149), NMFS (NMFS-71), NWS (NWS-24, NWS-127, and NWS-182), NESDIS (NESDIS-37) and OMAO (OMAO-19).

The modernization enables NOAA to re-architect its network infrastructure to gain efficiencies and resilience, realize significantly reduced costs for network services after transition, and minimize risk as legacy services are discontinued. Increased funding will accelerate the transition and enable NOAA to: (a) contract for engineering services to re-architect the network infrastructure and establish detailed transition plans; (b) issue awards for new hardware and telecommunication services; (c) trench and lay new lines, decommission and provision circuits; and (d) establish funding for administrative services to provide ordering, invoice processing, and inventory management. By expediting the technology modernization and migration to the new EIS vendors, NOAA will realize significant reductions in price and cost-avoidance. This funding will reduce risks related to service delivery and operations due to termination of GSA legacy service contracts.

The funds specifically requested here for CIO will also enable the NOAA Enterprise Network Program Office (ENPO) to provide two dedicated staff and an enterprise management tool to support common ordering, invoicing, and inventory management to facilitate effective management of the telecommunications contracts and services throughout the lifecycle GSA estimates this approach results in approximately five percent of administrative cost avoidance each year.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

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(Dollar amounts in thousands)

Schedule and Milestones:

- Award NOAA task orders under EIS to support modernization needs
- Establish a sustainable, resilient architecture to meet NOAA's current and planned needs
- Transition 100% NOAA Legacy GSA inventory to EIS

Deliverables:

- Modernized telecommunications infrastructure capable of meeting the agency's mission
- Provide a centralized ordering and management platform
- Provide a secure infrastructure resistant to extreme weather impacts

Performance Measures	2022	2023	2024	2025	2026
Transition of NOAA Telecommunication services to GSA's EIS					
With Increase	35%	60%	80%	100%	0%
Without Increase	20%	45%	55%	65%	75%
Outyear Costs:					
Direct Obligations	1,770	1,770	1,770	1,770	1,770
Capitalized	0	0	0	0	0
Uncapitalized	1,770	1,770	1,770	1,770	1,770
Budget Authority	1,770	1,770	1,770	1,770	1,770
Outlays	1,097	1,097	1,097	1,097	1,097
FTE	2	2	2	2	2
Positions	2	2	2	2	2

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PROGRAM CHANGE PERSONNEL DETAIL

Activity: Mission Services and Management
Subactivity: Mission Services and Management
Program Change: Enterprise Infrastructure Solution (EIS)

Title		Grade	Number	Annual Salary	Total Salaries
Management and Program Analyst		ZP-03	2	114,498	228,996
Total			2		228,996
Less lapse	25.00%		(1)		(57,249)
Total full-time permanent (FTE)			2		171,747
2022 Pay Adjustment (2.7%)					4,637
					176,384

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	2
Total FTE	2
Authorized Positions:	
Full-time permanent	2
Total Positions	2

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Mission Services and Management
Subactivity: Mission Services and Management

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	62,430	69,441	70,990	71,166	176
11.3	Other than full-time permanent	338	338	338	338	0
11.5	Other personnel compensation	1,944	1,945	1,944	1,944	0
11.7	Military personnel compensation	515	661	0	0	0
11.9	Total personnel compensation	65,227	72,385	73,272	73,448	176
12	Civilian personnel benefits	20,609	22,923	25,421	25,464	43
13	Benefits for former personnel	53	52	52	52	0
21	Travel and transportation of persons	471	459	459	459	0
22	Transportation of things	149	145	149	149	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	5,860	5,716	5,749	5,749	0
23.2	Rental Payments to others	683	666	666	666	0
23.3	Communications, utilities and misc charges	930	907	1,407	2,958	1,551
24	Printing and reproduction	379	370	376	376	0
25.1	Advisory and assistance services	19,162	18,691	18,791	18,791	0
25.2	Other services from non-Federal sources	23,529	17,698	18,918	18,918	0
25.3	Other goods and services from Federal sources	11,189	10,914	14,018	14,018	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	554	540	553	553	0
31	Equipment	1,216	1,186	1,207	1,207	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	89	87	87	87	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	16	16	16	16	0
44	Refunds	0	0	0	0	0
99	Total obligations	150,116	152,755	161,141	162,911	1,770

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Mission Services and Management	Pos./BA	625	161,141	627	161,641	2	500
	FTE/OBL	594	161,141	596	161,641	2	500

Spectrum (+$500, 2 FTE/2 Positions) – This request will improve the capacity of the agency's radio-frequency spectrum management services. With these funds NOAA will have the ability to effectively manage its access to this vital resource, protect mission capabilities that rely on it, and provide data and analyses that inform spectrum sharing initiatives to support wireless broadband that will benefit underserved communities across the Nation. Radio spectrum is a finite resource used by NOAA and by the private sector for commerce. NOAA's workload is increasingly driven by demand for radio spectrum by commercial and government operations, and has far outpaced NOAA spectrum management staffing and support resources. NOAA's leadership in climate sciences is highly dependent on radio-frequency spectrum to enable its operational systems for observations and communication.

The request will provide the funding and HR to perform engineering studies and radio interference modeling to increase the potential for successful spectrum sharing. Effective management and administration of the agency's radio spectrum needs requires: increased participation in domestic and international fora for spectrum regulations; greater engagement in policy making and decisions impacting the agency's mission services; complex technical studies to inform the establishment of regulatory protections for spectrum-dependent systems and foster more efficient use of radio spectrum resources; coordination of our incumbent services with new operators, including other Federal agencies; radio spectrum monitoring in reallocated bands that are susceptible to interference; and increasing management of mitigating actions to resolve radio interference events in more congested frequency bands.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022-2026

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(Dollar amounts in thousands)

- Establish organization positions and functions
- Establish engineering analysis capability

Deliverables:

- Database to support spectrum management of NOAA's spectrum dependent systems
- Interdepartmental Radio Advisory Committee and Sub-committee actions reviewed, analyzed and acted upon in a timely manner in the best interests of the agency
- Protection of access to spectrum and new spectrum as needed for NOAA operations via active participation in the International Telecommunications Union - Radiocommunication
- Improved representation at quadrennial, international World Radio Conference meetings to establish protections for new and incumbent operational systems
- Radio interference events are tracked and the time to resolve them is reduced.

Performance Measures	2022	2023	2024	2025	2026
Spectrum Policy Engagements with Regulators and External Partners					
With Increase	1	2	3	3	3
Without Increase	1	1	1	1	1
Concurrent Participation in World Radio Conference Meetings for Commerce/NOAA-related Agenda Items					
With Increase	4	5	6	6	6
Without Increase	4	4	4	4	4
Outyear Costs:					
Direct Obligations	500				500
Capitalized	0	0	0	0	0
	500	500	500		

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(Dollar amounts in thousands)

Uncapitalized	500	500	500	500	500
Budget Authority	500				500
Outlays	310	310	310		310
FTE	2	2	2	2	2
Positions	2	2	2	2	2
	500	500	500		
			310		

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Mission Services and Management
Subactivity: Mission Services and Management
Program Change: Spectrum

Title		Grade	Number	Annual Salary	Total Salaries
Electronics Engineer		ZP-IV	1	168,987	168,987
Electronics Engineer		ZP-IV	1	168,987	168,987
			0	0	0
Total			2		337,974
Less lapse	25.00%		0		(84,494)
Total full-time permanent (FTE)			2		253,481
2022 Pay Adjustment (2.7%)					6,844
					260,324

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	2
Total FTE	2
Authorized Positions:	
Full-time permanent	2
Total Positions	2

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Mission Services and Management
Subactivity: Mission Services and Management

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	62,430	69,441	70,990	71,250	260
11.3	Other than full-time permanent	338	338	338	338	0
11.5	Other personnel compensation	1,944	1,945	1,944	1,944	0
11.7	Military personnel compensation	515	661	0	0	0
11.9	Total personnel compensation	65,227	72,385	73,272	73,532	260
12	Civilian personnel benefits	20,609	22,923	25,421	25,499	78
13	Benefits for former personnel	53	52	52	52	0
21	Travel and transportation of persons	471	459	459	459	0
22	Transportation of things	149	145	149	149	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	5,860	5,716	5,749	5,749	0
23.2	Rental Payments to others	683	666	666	666	0
23.3	Communications, utilities and misc charges	930	907	1,407	1,407	0
24	Printing and reproduction	379	370	376	376	0
25.1	Advisory and assistance services	19,162	18,691	18,791	18,791	0
25.2	Other services from non-Federal sources	23,529	17,698	18,918	19,080	162
25.3	Other goods and services from Federal sources	11,189	10,914	14,018	14,018	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	554	540	553	553	0
31	Equipment	1,216	1,186	1,207	1,207	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	89	87	87	87	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	16	16	16	16	0
44	Refunds	0	0	0	0	0
99	Total obligations	150,116	152,755	161,141	161,641	500

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Mission Services and Management	Pos./BA	625	161,141	625	161,541	0	400
	FTE/OBL	594	161,141	594	161,541	0	400

Strengthen Diversity in NOAA IT (+$400, 0 FTE/0 Positions) – In coordination with the Office of Human Capital Services (OHCS), the Office of the Chief Information Officer (OCIO) will expand on an IT Fellowship Program to move NOAA forward in developing a high-quality, diverse, entry-level Information Technology (IT) workforce. OCIO will leverage partnerships with minority-serving institutions and public-private partnerships, such as the Partnership for Public Service Cybersecurity Talent Initiative to attract, recruit, develop and retain highly skilled IT professionals at entry-grade levels. The funds will provide for a contracted IT Fellowship Program manager and support to administer the program. Demand for IT professionals is high nationwide and especially in the National Capital Region. In order to compete with the private sector and other government agencies NOAA must expand the opportunities it provides to promising candidates, including IT professionals of color.

The IT Fellowship Program leverages existing hiring authorities (Pathways, Recent Graduate Programs, Schedule A(r)) to recruit undergraduate and graduate-level college students and recent graduates of IT and cybersecurity disciplines to join NOAA as Federal employees. The Program provides opportunities to gain early career job skills and professional experience with the Federal government. Students return to the classroom with “real world” learning experience and an ongoing relationship with NOAA to collaborate on development of use cases for classroom instruction. NOAA will infuse new, diverse talent into its workforce to fill existing vacancies and address succession planning challenges. This approach introduces IT Fellows to support NOAA’s unique mission, provides group training and mentoring opportunities, and creates connections to peers and IT leaders in NOAA.

The IT Fellowship Program will address objectives in the NOAA Information Resource Management Strategy (2021-2025) and the IT Workforce Strategic Plan (2018-2023) to establish a pipeline to infuse new talent within the current NOAA workforce while focusing on Diversity and Inclusion.

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(Dollar amounts in thousands)

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

Schedule and Milestones:
FY 2022 – 2023

- In coordination with OHCS, send out Data Call to all Hiring Officials within NOAA
- Open recruiting case with OHCS for each hiring authority at all 3 bands (4 total)
- Annual IT Fellowship Program execution briefing to the CIO Council to review goals, objectives, targets and performance relative to the NOAA Information Resource Management Strategy and IT Workforce Strategic Plan.
- Data call sent via OHCS to all Hiring Officials prior to engaging Line/Staff Offices with the IT Fellowship Program
- Development of Smartsheet dashboard and reports to track data call results, status of candidate recruiting and onboarding, and program performance measures
- Kick-off New Cohort

Deliverables:

- SOP for IT Fellowship – Interns, Recent Graduates, and Partnership for Public Service Cybersecurity Talent Initiative
- Smartsheet dashboard and reports
- Onboarding schedule
- Training plan for IT Fellowship Program participants
- Recruiting material for virtual or in-person recruiting events for the IT Fellowship Program

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(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of IT Fellows in the Program					
With Increase	12	15	20	20	25
Without Increase	8	10	10	10	10
Outyear Costs:					
Direct Obligations	400	400	400	400	400
Capitalized	0	0	0	0	0
Uncapitalized	400				
Budget Authority	400				
Outlays	248	248	248	248	
FTE	0400	0400	0400	0400	0
Positions	0	0	0	0	0
	400	400	400	400	
				248	

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Mission Services and Management
Subactivity: Mission Services and Management

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	62,430	69,441	70,990	70,990	0
11.3	Other than full-time permanent	338	338	338	338	0
11.5	Other personnel compensation	1,944	1,945	1,944	1,944	0
11.7	Military personnel compensation	515	661	0	0	0
11.9	Total personnel compensation	65,227	72,385	73,272	73,272	0
12	Civilian personnel benefits	20,609	22,923	25,421	25,421	0
13	Benefits for former personnel	53	52	52	52	0
21	Travel and transportation of persons	471	459	459	459	0
22	Transportation of things	149	145	149	149	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	5,860	5,716	5,749	5,749	0
23.2	Rental Payments to others	683	666	666	666	0
23.3	Communications, utilities and misc charges	930	907	1,407	1,407	0
24	Printing and reproduction	379	370	376	376	0
25.1	Advisory and assistance services	19,162	18,691	18,791	18,791	0
25.2	Other services from non-Federal sources	23,529	17,698	18,918	19,318	400
25.3	Other goods and services from Federal sources	11,189	10,914	14,018	14,018	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	554	540	553	553	0
31	Equipment	1,216	1,186	1,207	1,207	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	89	87	87	87	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	16	16	16	16	0
44	Refunds	0	0	0	0	0
99	Total obligations	150,116	152,755	161,141	161,541	400

Department of Commerce
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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Mission Services and Management	Pos./BA	625	161,141	626	162,641	1	1,500
	FTE/OBL	594	161,141	595	162,641	1	1,500

NOAA Recruiting Program ($1,500, 1 FTE/1 Position) – This request will enable the Office of Human Capital Services (OHCS) to develop and execute a NOAA-wide recruiting program. It will provide our internal recruitment consultants with tools and processes to optimally inform and partner with front line supervisors to satisfy diverse recruitment needs and significantly expand NOAA outreach work. This program will derive major inputs from ongoing initiatives throughout the organization specifically focused on recruiting top minority and underserved community candidates with STEM educations and professional backgrounds. Additionally, it will significantly enhance NOAA recruiting by employing the results of ongoing workforce and succession planning efforts. This program will improve entry level hiring outreach and create a student-in-residence program to engage and employ students on a part time basis year round to assist with recruiting efforts on the campuses of targeted MSIs.

This request is integral to market NOAA through formal partnerships by branding, building, and expanding upon NOAA's name and mission with MSIs (i.e. Tribal Colleges, Historically Black Colleges and Universities, Hispanic Servicing Institutions, etc.) and targeted communities as we continue to enhance long term commitments to sponsor partnerships (i.e. with League of United Latin American Citizens, Society of Advancement of Chicanos/Hispanics and Native Americans in Science, National Association for the Advancement of Colored People, United Negro College Fund, Hispanic Association of Colleges and Universities, etc.). NOAA will become a more widely known preferred employer in all science environments, thereby widely expanding upon opportunities to recruit top talent from diverse backgrounds into the organization.

Nearly 40 percent of NOAA's science workforce is projected to be eligible to retire in the next five years. Therefore, we need more efficient and effective tools to position NOAA as a diverse, world-premiere organization. This initiative will also provide a single online portal that presents various NOAA internship programs as well as links to advertised internship opportunities on USAJobs to potential interns, entry

level job candidates, and supervisors/managers. This recruitment program will work closely with the Office of the Chief Information Officer (OCIO) to staff their IT Fellowship program with candidates from minority serving institutes.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

Schedule and Milestones:
FY 2022-2026

- Conduct virtual and in-person hiring fairs
- Develop an automated database of candidates that can be data-mined (e.g. by occupation or eligibility for special hiring authority) to enable quick identification of potential hires
- Employ results of the workforce analysis to identify specific skill needs and respective diverse recruiting audiences
- Employ our consultative services efforts to approach candidates who are not familiar with NOAA and capture their interest for current and future recruitment
- Craft the NOAA Recruiting Program, engaging our Employee Resource Groups, the NOAA Office of Education, and LO/SOs to address priorities and future requirements
- Partner with OICR to execute NOAA's diversity and inclusion recruitment initiatives to improve NOAA's standing as a best place to work in government
- Develop and deploy tailored support for interns including mentoring and professional development

Deliverables:

- NOAA-wide recruiting program supported by tools and processes to identify, target and engage specific skilled diverse audiences through multiple avenues, including substantial expansion of the use of social media
- Web-based solution that delivers a central clearing house of information on our internships and open entry-level job opportunities, with a focus on increasing the ease of applying for internship opportunities, marketing NOAA more extensively, and ensuring we outreach/recruit/hire individuals from diverse backgrounds
- A student in residence program to recruit undergraduate and recent graduates into NOAA positions
- Hiring metrics that will enhance skill to position requirements for each Line and Staff Office
- Database of candidates with STEM backgrounds

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(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Targeted Recruitment Outreach Events					
With Increase	3	5	10	15	15
Without Increase	2	2	2	2	2
Student In Residence Participants					
With Increase	2	5	10	10	10
Without Increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	1,500	1,500	1,500	1,500	1,500
Capitalized	0	0	0	0	0
Uncapitalized	1,500	1,500			1,500
Budget Authority	1,500	1,500			1,500
Outlays	930	930	930		930
FTE	1	1	1	1	1
Positions	1	11,500	11,500	1	1
		1,500	1,500		
			930		

Department of Commerce
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PROGRAM CHANGE PERSONNEL DETAIL

Activity: Mission Services and Management
Subactivity: Mission Services and Management
Program Change: NOAA Recruiting Program

Title		Grade	Number	Annual Salary	Total Salaries
HR Specialist		ZA-IV	1	159,000	159,000
Total			1		159,000
Less lapse	25.00%		(0)		(39,750)
Total full-time permanent (FTE)			1		119,250
2022 Pay Adjustment (2.7%)					3,220
					122,470

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	1
Total FTE	1
Authorized Positions:	
Full-time permanent	1
Total Positions	1

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Mission Services and Management
Subactivity: Mission Services and Management

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	62,430	69,441	70,990	71,112	122
11.3	Other than full-time permanent	338	338	338	338	0
11.5	Other personnel compensation	1,944	1,945	1,944	1,947	3
11.7	Military personnel compensation	515	661	0	0	0
11.9	Total personnel compensation	65,227	72,385	73,272	73,397	125
12	Civilian personnel benefits	20,609	22,923	25,421	25,460	39
13	Benefits for former personnel	53	52	52	52	0
21	Travel and transportation of persons	471	459	459	484	25
22	Transportation of things	149	145	149	149	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	5,860	5,716	5,749	5,757	8
23.2	Rental Payments to others	683	666	666	666	0
23.3	Communications, utilities and misc charges	930	907	1,407	1,407	0
24	Printing and reproduction	379	370	376	376	0
25.1	Advisory and assistance services	19,162	18,691	18,791	18,791	0
25.2	Other services from non-Federal sources	23,529	17,698	18,918	20,186	1,268
25.3	Other goods and services from Federal sources	11,189	10,914	14,018	14,018	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	554	540	553	573	20
31	Equipment	1,216	1,186	1,207	1,222	15
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	89	87	87	87	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	16	16	16	16	0
44	Refunds	0	0	0	0	0
99	Total obligations	150,116	152,755	161,141	162,641	1,500

Department of Commerce
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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Mission Services and Management	Pos./BA	625	161,141	626	161,741	1	600
	FTE/OBL	594	161,141	595	161,741	1	600

NOAA Facilitation Network (+$600, 1 FTE/1 Position) – This request will formalize and manage a NOAA Facilitation Network, an internal, cross-line office effort to develop organizational excellence by promoting more inclusive, productive and efficient meetings, planning sessions and training workshops. The Network will accomplish this by training, certifying and employing a diverse group of NOAA employees who will serve as professional meeting facilitators. NOAA is capitalizing on recent years' success of volunteers who offered ad hoc facilitation services and found NOAA organizations to be an eager audience.

Many other Federal government agencies provide certified facilitation services with great success. Facilitation by a neutral third-party has been proven to be an effective way to manage and streamline meetings, amicably resolve workplace conflicts, empower teams to operate at their full creative potential, and promote dynamic group processes to maximize outcomes. Organizations who employ certified facilitators consistently report that they have learned to work smarter, better and faster while building significant rapport among all types of teams. An in-house cadre of facilitators will serve NOAA in the same way by providing process expertise, improving meeting outcomes, and reducing the cost and need for contracted services.

This Network will build on the success of an ad hoc program pilot that has facilitated over 100 events at a cost savings of $450 thousand compared to an external vendor over the past several years. The former ad hoc effort will be replaced by one program manager who will organize existing certified facilitators and provide immediate services to NOAA organizations while managing the recruitment, training and qualification of new facilitators. Formalizing the program will increase its visibility and meet the demand for facilitation services expressed by Line and Staff Offices. Collectively, the Network will facilitate meetings, discussions and working groups based on proven principles and practices. Facilitation Network topics will include: Strategy Planning, Action Planning, Issue Mapping, Process Mapping, Problem Solving, Conflict Resolution, Project Planning, Organizational Change, Business Re-engineering, Regulatory/Policy Development, Innovation/Creativity Sessions and Senior Management Meetings.

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(Dollar amounts in thousands)

The Network will provide facilitators who are geographically distributed thereby providing trained personnel who understand local work environments and the many sub-cultures that affect NOAA operations. A distributed network will also moderate costs of required travel while increasing availability of facilitators to users.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

Schedule and Milestones:
FY 2022-2026
- Establish a Facilitation Program Manager.
- Build a cadre of facilitators from those currently qualified and recruit and train new personnel
- Train the first new NOAA cohort using a contract vendor. Build the cohort to a project total of approximately 50 participants by the end of FY 2022
- Develop a Facilitation Community of Practice to promote standardization of service, share best practices, and refine continual learning opportunities for the facilitators
- Market the capability to all NOAA organizations while offering readily available facilitation services. Develop internal training course to train NOAA staff in FY 2023 (train the trainer approach) and provide an additional 50 facilitators during FY 2023

Deliverables:
- Certified facilitators geographically dispersed and representing all of NOAA's diverse and inclusive population
- Facilitation services to NOAA

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(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of facilitations completed					
With Increase	50	100			
Without Increase	0	0	0	0	0
Number of facilitators officially certified		125	150	175	
With Increase	15	30	40	40	40
Without Increase	1	1	1	1	1
Outyear Costs:					
Direct Obligations	600	600	600	600	600
Capitalized	0	0	0	0	0
Uncapitalized	600				
Budget Authority	600	600			
Outlays	372	372	372	372	
FTE	1600	1600	1600	1600	1
Positions	1	1	1	1	1
		600	600	600	
				372	

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PROGRAM CHANGE PERSONNEL DETAIL

Activity: Mission Services and Management
Subactivity: Mission Services and Management
Program Change: NOAA Facilitation Network

Title		Grade	Number	Annual Salary	Total Salaries
HR Specialist		ZA-IV	1	159,000	159,000
Total			1		159,000
Less lapse	25.00%		(0)		(39,750)
Total full-time permanent (FTE)			1		119,250
2022 Pay Adjustment (2.7%)					3,220
					122,470

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	1
Total FTE	1
Authorized Positions:	
Full-time permanent	1
Total Positions	1

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Mission Services and Management
Subactivity: Mission Services and Management

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	62,430	69,441	70,990	71,112	122
11.3	Other than full-time permanent	338	338	338	338	0
11.5	Other personnel compensation	1,944	1,945	1,944	1,947	3
11.7	Military personnel compensation	515	661	0	0	0
11.9	Total personnel compensation	65,227	72,385	73,272	73,397	125
12	Civilian personnel benefits	20,609	22,923	25,421	25,460	39
13	Benefits for former personnel	53	52	52	52	0
21	Travel and transportation of persons	471	459	459	462	3
22	Transportation of things	149	145	149	149	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	5,860	5,716	5,749	5,757	8
23.2	Rental Payments to others	683	666	666	666	0
23.3	Communications, utilities and misc charges	930	907	1,407	1,407	0
24	Printing and reproduction	379	370	376	376	0
25.1	Advisory and assistance services	19,162	18,691	18,791	19,213	422
25.2	Other services from non-Federal sources	23,529	17,698	18,918	18,918	0
25.3	Other goods and services from Federal sources	11,189	10,914	14,018	14,018	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	554	540	553	554	1
31	Equipment	1,216	1,186	1,207	1,209	2
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	89	87	87	87	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	16	16	16	16	0
44	Refunds	0	0	0	0	0
99	Total obligations	150,116	152,755	161,141	161,741	600

Department of Commerce
National Oceanic and Atmospheric Administration
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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Mission Services and Management	Pos./BA	625	161,141	631	164,041	6	2,900
	FTE/OBL	594	161,141	599	164,041	5	2,900

Accelerate NOAA's Diversity and Inclusion Plan (+$2,900, 5 FTE/6 Positions) – In 2020, during a time of civil unrest within our Nation, there was been an urgent call to promote diversity, equity, and inclusion (DEI). In response, government agencies have increased efforts to affirm their support of these initiatives. With the arrival of a new administration in 2021, even greater emphasis has been placed on DEI. To that regard, several Executive Orders have been published to hold Federal agencies accountable and to document progress (or lack thereof) of DEI initiatives. Historically, NOAA's Office of Civil Rights primarily performed Equal Employment Opportunity (EEO) functions mandated by U.S. laws and the EEO Commission. The office recently transited to the Office of Inclusion and Civil Rights (OICR) to include affirmative employment and DEI programs. NOAA requests additional funds to fully implement its Diversity and Inclusion (D&I) Plan.

Additional resources will also enable NOAA to comply with the provisions of EO 13985, Advancing Racial Equity and Support for Underrepresented Communities Through the Federal Government. EO 13985 calls for agencies to pursue a comprehensive approach to advancing equity for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality. Agencies are required to assess current programs and policies which perpetuate systemic barriers to opportunities and benefits for people of color and other underserved populations. Training and outreach resources are required for staff, supervisors and leaders. Tools will be developed to track progress and measure DEI outcomes.

Statistics show that between 2010 and 2019, changes within NOAA's workforce demographics have been minimal. NOAA needs to increase efforts to attract, recruit, hire, and retain a diverse workforce. Underrepresentation of women and minorities continues to be an area of great concern. NOAA's vision for diversity and inclusion is one where NOAA leverages diversity to achieve mission goals and business objectives and maximizes the potential of individuals and the organization. The investment in additional personnel within OICR will make NOAA's DEI vision a reality.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of

environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

Schedule and Milestones:

FY 2022-2026

- DEI data collection
- Extensive barrier analysis to identify and affirm root causes of under representation
- Develop DEI training resources for leaders and workforce
- Enhance targeted outreach to attract underrepresented populations
- Acquire additional IT Support
- Enhance virtual training platform to accommodate larger volume of participants
- Develop tools to track progress and measure DEI outcomes
- Expand efforts to market NOAA as an “Employer of Choice”
- Develop DEI training for Managers, Supervisors, and workforce
- Develop DEI Incentive Award Program
- On-going evaluation of DEI initiatives; suggested revisions as deemed necessary

Deliverables:

- DEI organizational assessment Report of Findings
- D&I Accomplishments Incentive Award Program
- EEO Library for facilitated and/or self-study DEI training
- DEI Dashboard to monitor and report progress
- DEI training agency-wide for leaders and workforce
- Increased numbers of underrepresented populations within the workforce
- A diverse workforce and a culture of inclusion within NOAA

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(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Number of D&I Goals and Objectives Achieved					
With Increase	50	60	70	80	90
Without Increase	20	30	35	45	50

	2022	2023	2024	2025	2026
Percent of Workforce Trained					
With Increase	40	90	90	90	90
Without Increase	25	40	90	90	90
Outyear Costs:					
Direct Obligations	2,900	2,900	2,900	2,900	2,900
Capitalized	0	0	0	0	0
Uncapitalized	2,900	2,900	2,900	2,900	2,900
Budget Authority	2,900	2,900	2,900	2,900	2,900
Outlays	1,798	1,798	1,798	1,798	1,798
FTE	5	6	6	6	6
Positions	6	6	6	6	6

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Mission Services and Management
Subactivity: Mission Services and Management
Program Change: Accelerate NOAA's Diversity and Inclusion Plan

Title		Grade	Number	Annual Salary	Total Salaries
Chief Diversity Officer		ZA-IV	1	140,000	140,000
Special Emphasis Program Manager		ZA-IV	1	140,000	140,000
Statistician		ZA-IV	1	140,000	140,000
Social Scientist		ZA-IV	1	140,000	140,000
EEO Specialist		ZA-IV	1	140,000	140,000
Administrative Specialist		ZS-III	1	90,000	90,000
Total			6		790,000
Less lapse	25.00%		(1)		(197,500)
Total full-time permanent (FTE)			5		592,500
2022 Pay Adjustment (2.7%)					15,998
					608,498

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	5
Total FTE	5
Authorized Positions:	
Full-time permanent	6
Total Positions	6

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Mission Services and Management
Subactivity: Mission Services and Management

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	62,430	69,441	70,990	71,598	608
11.3	Other than full-time permanent	338	338	338	338	0
11.5	Other personnel compensation	1,944	1,945	1,944	1,944	0
11.7	Military personnel compensation	515	661	0	0	0
11.9	Total personnel compensation	65,227	72,385	73,272	73,880	608
12	Civilian personnel benefits	20,609	22,923	25,421	25,603	182
13	Benefits for former personnel	53	52	52	52	0
21	Travel and transportation of persons	471	459	459	459	0
22	Transportation of things	149	145	149	149	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	5,860	5,716	5,749	5,749	0
23.2	Rental Payments to others	683	666	666	666	0
23.3	Communications, utilities and misc charges	930	907	1,407	1,407	0
24	Printing and reproduction	379	370	376	376	0
25.1	Advisory and assistance services	19,162	18,691	18,791	20,901	2,110
25.2	Other services from non-Federal sources	23,529	17,698	18,918	18,918	0
25.3	Other goods and services from Federal sources	11,189	10,914	14,018	14,018	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	554	540	553	553	0
31	Equipment	1,216	1,186	1,207	1,207	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	89	87	87	87	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	16	16	16	16	0
44	Refunds	0	0	0	0	0
99	Total obligations	150,116	152,755	161,141	164,041	2,900

Department of Commerce
National Oceanic and Atmospheric Administration
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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Mission Services and Management	Pos./BA	625	161,141	628	162,041	3	900
	FTE/OBL	594	161,141	596	162,041	2	900

Workplace Violence Prevention and Response Program – Racial Equity/Wellness (+$900, 2 FTE/3 Positions) – The Workplace Violence Prevention and Response Program (WVPRP) develops comprehensive services for victims of sexual assault and sexual harassment (SASH) for all NOAA employees, contractors, and affiliates. WVPRP also tracks incidents and cases of workplace violence, and coordinates the annual congressional report, provides ongoing consultation to leadership, and coordinates the development of the workplace violence prevention plan which creates goals to be reviewed biannually.

WVPRP requests funds to establish three full-time positions. Increased staffing will support program evaluations such as needs assessments, and gap analyses for both NOAA and WVPRP ensuring culturally competent victim services, social justice, and racial equity. WVPRP will also co-lead the implementation of EO 13985, including achieving the Order's Section 8 goals of strengthening engagement of underserved communities, by embedding "community liaisons" strategically in selected NOAA programs to build more meaningful coordination. WVPRP will also be able to expand services specifically for Alaska, the highest risk area in NOAA. An Alaska program coordinator will provide SASH victim services for the entire Alaska region, recruit and train victim advocate liaisons, and assist in prevention efforts and initiatives. Lastly, WVPRP will be able to conduct local wellness activities quarterly, implementing a NOAA wellness strategy to improve a safe and healthy work environment based on the results of NOAA's first-of-its-kind "We Are NOAA" workplace culture survey. The unfortunate reality is that mental health and substance abuse are on the rise nationally due to COVID-19, with repercussions sure to last. With WVPRP support, NOAA will proactively enhance its Wellness activities regionally as Wellness has been shown in recent studies to enhance productivity by addressing employees' emotional well-being directly.

NOAA’s cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

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(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022 – 2026

- Increase prevention services with computer-based training and in-person bystander intervention, development of resiliency training
- Expand the RAINN contract to include dedicated hotline/helpline for SASH response services
- Develop tool kits for employees and management, outreach materials
- Participate in the National Academies of Science Action Collaborative
- Create, and provide regional program coordinators to include Alaska
- Develop methods to address intersectionality, racial equity, and mission related needs

Deliverables:

- Expanded workplace violence database
- Response services spanning across all of NOAA's regions
- Program evaluations for culturally competent services
- Victim advocate response satisfaction survey
- SASH/workplace violence training satisfaction survey
- Biannual workplace violence attitudes survey
- Expanded toolkits for employee and management
- Wellness Newsletter and quarterly wellness activities

Performance Measures	2022	2023	2024	2025	2026
Percent of workforce trained					
With Increase	100	100	100	100	100
Without Increase	90	90	90	90	90
Outyear Costs:					
Direct Obligations	900	900	900	900	900

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Capitalized	0	0	0	0	0
Uncapitalized	900				
Budget Authority	900	900			
Outlays	887	887	887	887	
FTE	2900	3900	3900	3900	3
Positions	3	3	3	3	3
		900	900	900	
				887	

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Mission Services and Management
Subactivity: Mission Services and Management
Program Change: Workplace Violence Prevention and Response Program

Title		Grade	Number	Annual Salary	Total Salaries
Communications: Writer/Editor		ZA-III	1	121,578	121,578
Social Scientist		ZA-IV	1	148,142	148,142
Alaska Program Coordinator		ZP-IV	1	121,578	121,578
Total			3		391,298
Less lapse	25.00%		(1)		(97,825)
Total full-time permanent (FTE)			2		293,474
2022 Pay Adjustment (2.7%)					7,924
					301,397

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	2
Total FTE	2
Authorized Positions:	
Full-time permanent	3
Total Positions	3

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Mission Services and Management
Subactivity: Mission Services and Management

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	62,430	69,441	70,990	71,598	608
11.3	Other than full-time permanent	338	338	338	338	0
11.5	Other personnel compensation	1,944	1,945	1,944	1,944	0
11.7	Military personnel compensation	515	661	0	0	0
11.9	Total personnel compensation	65,227	72,385	73,272	73,880	608
12	Civilian personnel benefits	20,609	22,923	25,421	25,603	182
13	Benefits for former personnel	53	52	52	52	0
21	Travel and transportation of persons	471	459	459	459	0
22	Transportation of things	149	145	149	149	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	5,860	5,716	5,749	5,749	0
23.2	Rental Payments to others	683	666	666	666	0
23.3	Communications, utilities and misc charges	930	907	1,407	1,407	0
24	Printing and reproduction	379	370	376	376	0
25.1	Advisory and assistance services	19,162	18,691	18,791	20,901	2,110
25.2	Other services from non-Federal sources	23,529	17,698	18,918	18,918	0
25.3	Other goods and services from Federal sources	11,189	10,914	14,018	14,018	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	554	540	553	553	0
31	Equipment	1,216	1,186	1,207	1,207	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	89	87	87	87	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	16	16	16	16	0
44	Refunds	0	0	0	0	0
99	Total obligations	150,116	152,755	161,141	164,041	2,900

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National Oceanic and Atmospheric Administration
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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
IT Security	Pos./BA	20	15,865	20	35,365	0	19,500
	FTE/OBL	19	15,865	19	35,365	0	19,500

Improve NOAA's Cybersecurity (+$19,500, 0 FTE/0 Positions) – The greatest shortfalls in NOAA cybersecurity are at the individual mission system level. With these requested funds NOAA will establish dedicated funding within Mission Support that is not dependent on the direct bill process to ensure critical cybersecurity activities are maintained. This will replace direct bill funding for cybersecurity so that Line and Staff Offices (LO/SOs) can retain funds to address their specific Federal Information Security Management Act (FISMA) system cybersecurity vulnerabilities and needed cybersecurity architectural and technological improvements, thereby strengthening NOAA's overall cybersecurity compliance and ability to handle evolving threats. LO/SOs will be able to focus on new cybersecurity requirements (e.g. Supply Chain Risk Management and High Value Assets). The massive SolarWinds incident coupled with the recent Microsoft and Pulse Connect Secure incidents and new Federal policies addressing foreign threats, highlight the need for cybersecurity resources not only at the enterprise level, but also at the LO/SO level to protect NOAA's missions from novel cybersecurity attacks (e.g. supply chain attacks and internal risk).

The threat landscape of cyberattacks is increasing and malicious programs are advancing capabilities and features making it nearly impossible for older, and in some cases current technology to detect them. This request will allow for a steady funding approach to maintain evolving IT capabilities related to continued mission demand on these infrastructures. The NOAA CIO, with the support of the CIO Council, will provide oversight over each LO/SO CIO budget to ensure the funds that are returned to the LO/SO are utilized correctly.

To protect information and IT services and enable LO/SO missions, it is critical to have the capabilities to protect, detect, and respond to advanced and evolving cybersecurity threats to ensure timely delivery of NOAA data to the world and cloud providers to support intra-NOAA communications and scientific collaboration.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022–2026

- Track FISMA, Cross-Agency Priority, and Reliability, Maintainability, Availability metrics for overall cybersecurity improvements across each NOAA Information system (Quarterly)
- LO/SO Identify funding gaps from new cybersecurity requirements (to comply with High Value Assets and Supply Chain Risk Management requirements)

Deliverables:

- Quarterly LO/SO Execution updates to CIO FISMA, Cross-Agency Priority, and Reliability, Maintainability, Availability reports. (Annually)

Performance Measures	2022	2023	2024	2025	2026
Percent of possible security incidents first identified by NOAA Security Operations Center					
With Increase	80	80	80	80	80
Without Increase	70	60	50	40	30
Outyear Costs:					
Direct Obligations	19,500	19,500	19,500	19,500	19,500
Capitalized	0	0	0	0	0
Uncapitalized	19,500	19,500	19,500	19,500	19,500
Budget Authority	19,500	19,500	19,500	19,500	19,500
Outlays	12,090	12,090	12,090	12,090	12,090
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: IT Security
Subactivity: IT Security

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	2,175	2,455	2,509	2,509	0
11.3	Other than full-time permanent	23	23	23	23	0
11.5	Other personnel compensation	50	50	50	50	0
11.7	Military personnel compensation	0	0	0	0	0
11.9	Total personnel compensation	2,248	2,528	2,582	2,582	0
12	Civilian personnel benefits	755	852	944	944	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	80	74	74	74	0
22	Transportation of things	13	12	12	12	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	389	358	378	378	0
23.2	Rental Payments to others	24	22	22	22	0
23.3	Communications, utilities and misc charges	156	144	162	162	0
24	Printing and reproduction	0	0	6	6	0
25.1	Advisory and assistance services	2	2	2	2	0
25.2	Other services from non-Federal sources	10,444	8,836	8,823	28,323	19,500
25.3	Other goods and services from Federal sources	2,247	2,069	2,369	2,369	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	296	273	279	279	0
31	Equipment	226	208	212	212	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	16,880	15,378	15,865	35,365	19,500

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Office of Education	Pos./BA	16	33,220	16	36,220	0	3,000
	FTE/OBL	16	33,220	16	36,220	0	3,000

Educational Partnership Program Climate Cooperative Science Center (+$3,000, 0 FTE/0 Positions) –This request establishes a NOAA Climate Cooperative Science Center as part of the Jose E Serrano Educational Partnership Program with Minority Serving Institutions (EPP/MSI). The Center will be established at a lead institution designated as an MSI by the U.S. Department of Education. Through a national competition, the Center will be established to train post-secondary students in climate science and related multi-disciplinary fields including, atmospheric sciences, oceanography, Earth science, meteorology, hydrology, geography, physics, chemistry and computer sciences. Within the MSI community, these disciplines exist at various levels and can be enhanced through financial assistance and research collaborations with NOAA scientists. These collaborations will enhance the training of the next generation of STEM graduates thereby creating opportunities to tap into the significant talent of students from traditionally underrepresented groups.

Funding for direct student support, including scholarships, graduate fellowships and post-doctoral studies will be made available to qualified students attending the established Climate Center. The Center will build capacity at a consortium of institutions composed primarily of MSIs. Using NOAA data and resources, the Climate Center would engage marginalized populations to develop solutions to climate issues with communities that are often more vulnerable and significantly impacted by flooding, hurricanes, tornadoes and other severe weather associated with climate change. The students, faculty, and researchers of the Climate Center will work with communities to enhance resilience and integrate research projects that address studies at the intersection of climate change, environmental justice and equity that underpin economic growth and stability. The graduates from the centers will be a resource for the Nation in addressing climate change and will contribute to a more diverse and equitable workforce.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022-2026

- Award financial assistance to an MSI that represents a consortium of academic institutions
- Develop capacity to educate train and to graduate students with the scientific knowledge and skills to approach climate studies from a comprehensive interdisciplinary approach
- Develop partnerships with the MSI community ensuring the Climate Center encompasses community resilience, equity and social justice projects that incorporate participation of environmental and economically vulnerable communities

Deliverables:

- Qualified pool of graduates trained in climate science, climate policy, and associated disciplines to successfully compete for positions at NOAA and other organizations with similar needs.
- Trained and graduated experts with the capacity to work with climate-vulnerable communities, including but not limited to low-income communities and traditionally underserved and underrepresented minority communities.
- Institutional capacity at supported MSIs, including addition of faculty, degree programs and professional development opportunities for students.

Performance Measures	2022	2023	2024	2025	2026
New students supported and trained through the Climate Cooperative Science Center.					
With Increase	15	15	15	15	15
Without Increase	0	0	0	0	0
Cumulative total of students supported and trained through the Climate Cooperative Science Center.					
With Increase	15	30	45	55	60
Without Increase	0	0	0	0	0
Degrees awarded to students who graduate with STEM degrees that focus on climate change.					
With Increase	0	5	10	15	15
Without Increase	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Outyear Costs:					
Direct Obligations	3,000	3,000	3,000	3,000	3,000
Capitalized	0	0	0	0	0
Uncapitalized	3,000	3,000	3,000	3,000	3,000
Budget Authority	3,000	3,000	3,000	3,000	3,000
Outlays	2,807	2,807	2,807	2,807	2,807
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Office of Education
Subactivity: Office of Education

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	2,087	2,248	2,303	2,303	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	88	88	88	88	0
11.7	Military personnel compensation	0	0	0	0	0
11.9	Total personnel compensation	2,175	2,336	2,391	2,391	0
12	Civilian personnel benefits	695	749	839	839	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	85	83	83	93	10
22	Transportation of things	8	8	8	8	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	156	153	173	173	0
23.2	Rental Payments to others	201	197	197	197	0
23.3	Communications, utilities and misc charges	10	10	16	16	0
24	Printing and reproduction	2	2	8	8	0
25.1	Advisory and assistance services	21	21	21	21	0
25.2	Other services from non-Federal sources	1,899	1,984	2,026	2,101	75
25.3	Other goods and services from Federal sources	31	30	30	30	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	48	47	48	48	0
31	Equipment	12	12	12	12	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	24,913	27,368	27,368	30,283	2,915
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	30,256	33,000	33,220	36,220	3,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase/Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Office of Education	Pos./BA	16	33,220	20	36,120	4	2,900
	FTE/OBL	16	33,220	19	36,120	3	2,900

Engaging New and Diverse Audiences with NOAA Science (+$2,900, 3 FTE/ 4 Positions) – The Office of Education requests an increase of $2.9 million to expand engagement with new and diverse audiences about NOAA's science, service and stewardship. This request will allow NOAA to provide dedicated funding for and build on its most successful public engagement programs, such as Science On a Sphere®, NOAA Heritage initiatives, and the Coastal Ecosystem Learning Centers Network. This initiative will increase NOAA's capacity to bring NOAA's cutting-edge science and compelling history to new audiences, with a focus on enhancing equity by engaging cultural and racial minorities. These programs will be supported by a new program, NOAA Ambassadors, which empowers NOAA staff to share their expertise through outreach events and by working with community partners. These expanded engagement efforts directly support NOAA's mission of sharing scientific knowledge and information and enable NOAA to further implement the American Innovation and Competitiveness Act.

Given our changing climate and the increase in severe weather events, droughts and wildfires, there has never been a more critical need to educate the public about how and why our planet is changing. Increased education about NOAA science can address this need. As NOAA continues to observe and predict changes in the planet, it is imperative that the public understand NOAA data and trust the Agency to provide accurate scientific products and services. Investments in science have a greater impact when paired with public engagement efforts, and NOAA has a powerful story to tell of enriching life through science and providing critical environmental data to the world. Importantly, NOAA also must expand its educational efforts to reach new audiences, including those from underserved communities that are often the most vulnerable to environmental hazards like climate change.

This initiative will support NOAA's vast network of 172 education partners and build new partnerships with those that have the ability to take complex issues and make them understandable and accessible by the public. Importantly, it will stabilize core support for the Science On a Sphere Program, NOAA's most far-reaching education tool. And it will enhance NOAA's work with the Nation's premier aquariums to better engage the public in protecting coastal and marine ecosystems, supporting community resilience, advancing equity and promoting other NOAA priorities. Through the Heritage program it will deepen the public's understanding and appreciation of NOAA's history, science, and

service to the Nation. Additionally, NOAA will develop new capacity for outreach and community engagement to vulnerable and underserved groups, especially around climate change issues, so that they may become better prepared and resilient.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

Schedule and Milestones:
FY 2022-2026

- Develop capacity for NOAA employees and affiliates to actively engage with informal science institutions and local communities to inform their communities about NOAA's mission
- Build awareness of NOAA careers through student outreach programs that target underrepresented populations
- Provide grants and in-kind support to external partners that offer exhibits and public programs around NOAA's mission
- Catalog, maintain, interpret and make available to partners NOAA's historical artifacts and other assets
- Maintain and build data products and technology that enable continuous delivery of near real-time data visualizations and other data products to NOAA's education partners

Deliverables:

- Science, products and services accessible to all residents of the United States
- NOAA's non-governmental partners have increased capacity to engage their audiences with NOAA's science, products and services
- Recognition of NOAA as a Federal agency operating with scientific integrity, providing trusted sources of scientific information, and conducting science that addresses today's problems
- NOAA engages with public audiences in ways that honor and center justice, equity, diversity, and inclusion goals

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
People reached through NOAA engagement programs (in millions).					
With Increase	70	72	75	77	80
Without Increase	61	61	59	55	52
Institutions that engage the public with a NOAA exhibit.					
With Increase	225	230	235	240	245
Without Increase	172	170	166	163	161
Real-time NOAA datasets and updated research models visualized and interpreted and made available to the public.					
With Increase	60	62	65	68	70
Without Increase	40	30	20	10	10
Number of NOAA staff who participate in public engagement programs through the NOAA Ambassadors program.					
With Increase	50	70	90	110	130
Without Increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	2,900	2,900	2,900	2,900	2,900
Capitalized	540	540	540	540	540
Uncapitalized	2,360	2,360	2,360	2,360	2,360

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Budget Authority	2,900				
Outlays	1,800	1,800	1,800	1,800	
FTE	3	4	4	4	4
Positions	4 2,900	4 2,900	4 2,900	4 2,900	4
				1,800	

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Office of Education
Subactivity: Office of Education
Program Change: Engaging new and diverse audiences with NOAA science

Title		Grade	Number	Annual Salary	Total Salaries
Supervisory Program Analyst		14	1	137,413	137,413
Communications Specialist		14	1	137,413	137,413
Outreach Specialist		12	1	96,639	96,639
IT Specialist		12	1	96,639	96,639
Total			4		468,104
Less lapse	25.00%		(1)		(117,026)
Total full-time permanent (FTE)			3		351,078
2022 Pay Adjustment (2.7%)					9,479
					360,557

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	3
Total FTE	3
Authorized Positions:	
Full-time permanent	4
Total Positions	4

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Office of Education
Subactivity: Office of Education

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	2,087	2,248	2,303	2,664	361
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	88	88	88	88	0
11.7	Military personnel compensation	0	0	0	0	0
11.9	Total personnel compensation	2,175	2,336	2,391	2,752	361
12	Civilian personnel benefits	695	749	839	929	90
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	85	83	83	108	25
22	Transportation of things	8	8	8	8	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	156	153	173	173	0
23.2	Rental Payments to others	201	197	197	217	20
23.3	Communications, utilities and misc charges	10	10	16	16	0
24	Printing and reproduction	2	2	8	8	0
25.1	Advisory and assistance services	21	21	21	21	0
25.2	Other services from non-Federal sources	1,899	1,984	2,026	2,566	540
25.3	Other goods and services from Federal	31	30	30	30	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	77	77
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	48	47	48	73	25
31	Equipment	12	12	12	77	65
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	24,913	27,368	27,368	29,065	1,697
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	30,256	33,000	33,220	36,120	2,900

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Office of Education	Pos./BA	16	33,220	16	35,220	0	2,000
	FTE/OBL	16	33,220	16	35,220	0	2,000

Environmental Literacy Grants for Community Resilience Education (+$2,000, 0 FTE/0 Positions) – The Office of Education will increase environmental literacy grants for community resilience education projects. Funded projects will develop and implement innovative approaches to building community resilience through formal and informal education and engage the most vulnerable children, youth, and adults in learning about and creating resilience for their communities. This increase will enable the Office of Education to fund more projects that involve the communities that bear a disproportionate share of the burden of climate change, i.e. communities of color, low income communities, and tribal and indigenous communities.

Since 2015, the Environmental Literacy Grants program has prioritized equitable approaches to building community resilience to extreme weather, climate change, and other environmental hazards, providing $12.5 million in Federal funding and reaching 180 communities. NOAA has only been able to fund four percent of the applications submitted, leaving $312 million of applications unfunded. This request provides critical funding and in-kind support for community resilience education projects that engage and involve people, especially those from historically marginalized communities. This funding will also enable NOAA to more fully implement the American Innovation and Competitiveness Act.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022-2026

- Compete and award additional grants to implement equitable community resilience education projects utilizing NOAA's science, data and expertise
- Develop partnerships with community-based organizations to further engage with historically marginalized communities

Deliverables:

- Each year, 13 new institutions and/or community-based organizations have greater capacity to help their communities increase resilience
- Each year, 30 new communities are served by resilience education projects
- Biennial grantee workshop to identify best practices and expand community of practice

Performance Measures	2022	2023	2024	2025	2026
Youth and adults participating in informal community resilience education programs					
With Increase	16,570	16,570	16,570	16,570	16,570
Without Increase	9,200	9,200	9,200	9,200	
K-12 students participating in formal community resilience education programs					
With Increase	6,130	6,130	6,130	6,130 9,200	6,130
Without Increase	3,400	3,400	3,400	3,400	
Educators participating in professional development programs for community resilience education					
With Increase	1,100	1,100	1,100	1,100 3,400	1,100
Without Increase	615	615	615	615	

615

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Direct Obligations	2,000	2,000	2,000	2,000	2,000
Capitalized	0	0	0	0	0
Uncapitalized	2,000	2,000			
Budget Authority	2,000	2,000			
Outlays	1,240	1,240 2,000	1,240 2,000	1,240 2,000	
FTE	0	0	0	0	0
Positions	0	0 2,000	0 2,000	0 2,000	0
				1,240	

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Office of Education
Subactivity: Office of Education

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	2,087	2,248	2,303	2,303	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	88	88	88	88	0
11.7	Military personnel compensation	0	0	0	0	0
11.9	Total personnel compensation	2,175	2,336	2,391	2,391	0
12	Civilian personnel benefits	695	749	839	839	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	85	83	83	83	0
22	Transportation of things	8	8	8	8	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	156	153	173	173	0
23.2	Rental Payments to others	201	197	197	197	0
23.3	Communications, utilities and misc charges	10	10	16	16	0
24	Printing and reproduction	2	2	8	8	0
25.1	Advisory and assistance services	21	21	21	21	0
25.2	Other services from non-Federal sources	1,899	1,984	2,026	2,176	150
25.3	Other goods and services from Federal	31	30	30	30	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	48	47	48	48	0
31	Equipment	12	12	12	12	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	24,913	27,368	27,368	29,218	1,850
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	30,256	33,000	33,220	35,220	2,000

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: Construction

Goal Statement

The Construction activity ensures that NOAA has safe and modern facilities to support NOAA's critical science, service, and stewardship mission.

Base Program

NOAA's facilities constitute a significant capital investment with over 690 different facilities across 160 markets and 6,965,592 total Usable Square Feet, including 401 NOAA-owned facilities with an estimated replacement value of $3 billion. These facilities require financial investments for maintenance, repairs, and modernization to effectively support NOAA mission, current and future. Construction acquisition and project planning enables NOAA to complete the analyses, pre-design work, and initial preparation that make the actual construction phase of projects more efficient and effective. Activities include National Environmental Policy Act (NEPA) planning, special environmental studies, condition surveys, site work, and any other preliminary development needed to ensure successful acquisition and completion of construction projects within budget and schedule.

Statement of Operating Objectives

Schedule and Milestones/Deliverables:

- In FY 2021, NOAA received $43.0 million to address NOAA's highest priority facilities construction projects including: Charleston, Ketchikan and Newport Piers and Silver Spring Metro Center Consolidation.
- In FY 2022, NOAA will:
    - Prioritize funding for NOAA's capital investment facilities needs including Newport Pier, Silver Spring Metro Center Consolidation and other priority projects in the Northwest and Alaska region
    - Allocate $4.0 million for the repayment of the Judgment Fund for the La Jolla Settlement and use remaining funds to execute projects to address NOAA's highest priority facilities repair and deferred maintenance requirements
    - Complete design work for the Newport Pier construction project to support an award
    - Complete construction of the Ketchikan Pier construction project
    - Complete NEPA environmental assessment and design for the Charleston Pier construction project.

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(Dollar amounts in thousands)

- Conduct further planning to implement the Northwest Regional Footprint Study, including prepare for the relocation of the Montlake Laboratory and develop a program of requirements for the Western Regional Center (WRC) and other sites in the Northwest Region that potentially could relocate to WRC

Explanation and Justification

Comparison by subactivity		2020 Actuals Personnel	2020 Actuals Amount	2021 Enacted Personnel	2021 Enacted Amount	2022 Base Personnel	2022 Base Amount
Construction	Pos/BA	0	40,924	1	43,000	1	43,000
	FTE/OBL	2	34,208	1	43,000	1	43,000
Total Construction	Pos/BA	0	40,924	1	43,000	1	43,000
	FTE/OBL	2	34,208	1	43,000	1	43,000

NOAA Construction

Constructing new facilities and reinvesting in existing facilities in accordance with a National Strategic Facilities Plan and/or compliance with the NOAA Facilities Council guidance is critical to NOAA's mission accomplishment. Conducting and effectively managing construction projects on facilities that have major deferred maintenance issues corrects health and life safety issues, averts emergency repairs and associated costs, reduces energy costs through creation of more efficient and sustainable building systems, brings facilities up to current safety, environmental and building code standards and minimizes overall sustainment costs.

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		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
NOAA Construction	Pos./BA	1	43,000	1	81,000	0	38,000
	FTE/OBL	1	43,000	1	81,000	0	38,000

Charleston, SC Pier and Facility Recapitalization (+$38,000, 0 FTE/0 Positions) – NOAA requests an increase for the recapitalization of NOAA pier Romeo located in Charleston, SC. The pier will ensure a permanent homeport for the NOAA Ship *Ronald H Brown* (RB) and the NOAA Ship *Nancy Foster* (NF). The recapitalization project will replace critical pier infrastructure and will ensure NOAA has fully functional pier space to support the current and future fleet.

In FY 2021, $5.0 million from the NOAA Construction PPA was allocated for the design of the Charleston pier restoration project. In FY 2022, NOAA will contribute an additional $4.0 million in base funds towards this pier construction for a total of $42.0 million.

Pier Romeo is in disrepair, and has not been used since 2006. During this time, NOAA ships were being berthed at the U.S. Coast Guard (USCG) Pier Papa in Charleston through an interagency agreement. In 2020, the USCG made the decision to homeport the newly constructed National Security Cutters at Base Charleston as a Super Base. On May 20, 2020, the USCG formally notified NOAA that they could not support berthing NOAA Ships at Pier Papa beyond February 2021. The NF and the RB are currently being berthed on a space-available basis at improvised locations; this uncertainty and limited supportability has a direct impact on operational efficiency and safety.

The current non-operational facility consists of a reinforced concrete pier, approximately 40,000 square-feet in size and approximately 650 feet in length, and a single-story concrete building (approximately 1,000 square-feet in size), that was originally developed as an electrical substation, that is located on the northeast end of the pier.

In January, FY 2021, NOAA awarded a contract for a NEPA Environmental Assessment, a Hazmat Survey, and construction permitting. NOAA will also award a design contract in FY 2021 and develop a full cost estimate for pier replacement and associated shore requirements.

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Additional funding in FY 2022, will support a contract award to demolish the existing pier structures including utilities, and associated onsite land site improvements. A design and build contract will also be awarded for the construction of OMAO's Southeast Marine Operations Hub. The Hub will include a new climate resilient replacement pier structure that that will be floating versus fixed. The project will also include new ship support utilities that focus on energy conservation efforts such as utilizing LED pier lighting and other renewable energy ideas such as geothermal heating and cooling systems, electrical generation via solar and/or wind electric generation, and other environmentally friendly technologies. Additionally, the project will investigate the use of a living shoreline implementation to help protect the existing shoreline from damage caused by storms, wave erosion, and sea-level rise. Other features of the project will include upgraded site utilities, new ship support warehouse, building control systems allowing setbacks during low or no occupancy periods, paving, fencing, and other associated site improvements required to support the NF and RB along with visiting NOAA vessels.

The Pier Romeo recapitalization project will highlight NOAA's dedication to build back better, by investing in modern and sustainable infrastructure that are critical in supporting NOAA's mission.

Fleet maintenance and construction are critical to NOAA's ability to collect climate data. NOAA's fleet support activities are directly aligned with Administration priorities, including EO 14008, through support for a science-based climate response and Made in America initiatives to benefit the American economy.

Schedule and Milestones:
FY 2022
- Demolition of existing structures at site
- Award contract for design and construction

FY 2025
- Complete construction
- Commission the new facility

Deliverables:
- Recapitalized pier facility construction completed and commissioned in FY 2025

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(Dollar amounts in thousands)

Outyear Costs:					
Direct Obligations	38,000	0	0	0	0
Capitalized	37,900	0	0	0	0
Uncapitalized	100	0	0	0	0
Budget Authority	38,000	0	0	0	0
Outlays	13,300	0	0	0	0
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Outyear Funding Estimates:

Charleston	2021 & Prior	2022	2023	2024	2025	2026	CTC	Total
Change from 2022 Base	N/A	38,000						
Total Request	5,000	42,000	0	0	0	0	0	47,000

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: NOAA Construction
Subactivity: NOAA Construction

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	83	84	85	85	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	2	2	2	2	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	85	86	87	87	0
12	Civilian personnel benefits	29	30	31	31	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	15	0	0	100	100
22	Transportation of things	0	0	0	0	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	408	400	400	400	0
25.2	Other services from non-Federal sources	30,937	42,484	42,482	80,088	37,606
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	503	0	0	0	0
31	Equipment	30	0	0	0	0
32	Lands and structures	2,020	0	0	294	294
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	1	0	0	0	0
99	Total obligations	34,028	43,000	43,000	81,000	38,000

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Office of Marine and Aviation Operations
Budget Estimates, Fiscal Year 2022

Executive Summary

For FY 2022, NOAA requests a total of $638,530,000 and 1,082 FTE/ 1,127 positions for the Office of Marine and Aviation Operations (OMAO), including an increase of $211,587,000 and 30 FTE/ 43 positions in program changes.

OMAO manages a variety of specialized ships and aircraft that make up the NOAA Fleet and plays a critical role in the in-situ collection of oceanographic, atmospheric, hydrographic, and fisheries data in support of NOAA's missions. The NOAA Fleet operates throughout the world supporting a wide array of NOAA missions including climate research, fisheries research, nautical charting, hurricane reconnaissance and research, snow surveys, and specialized atmospheric and ocean research. In addition, NOAA ships and aircraft provide emergency response capabilities. Following major natural and environmental disasters, NOAA ships and aircraft conduct emergency navigation hazard surveys that help ports reopen quickly and obtain aerial images of disaster-torn areas. These surveys are often the only source of data providing critical information for first responders, disaster response, and residents.

NOAA ships range from large oceanographic research vessels capable of exploring the world's deepest oceans to smaller ships responsible for charting the shallow bays and inlets of the United States. NOAA aircraft range from high altitude jets, capable of penetrating hurricanes and tracking ocean winds, to the Twin Otters, well-suited for water resource management data collection and marine mammal surveys where slower airspeeds and low altitudes are essential. OMAO is charged with the safe and efficient operation and maintenance of this NOAA fleet; developing annual Fleet Allocation Plans; conducting lifecycle maintenance; and providing centralized fleet management including: standard procedures, safety inspections, and medical services in partnership with the U.S. Public Health Service Commissioned Corps. OMAO also provides centralized coordination, support and guidance for uncrewed marine and aircraft systems (UxS) across NOAA, and administers the NOAA-wide Diving and Small Boat Programs. OMAO is committed to maintaining a safe field environment through the coordination of training and certification of officers, crew members, and scientists in at-sea and airborne safety procedures.

OMAO staff includes civilians along with the NOAA Commissioned Officer Corps (NOAA Corps), one of the Nation's eight uniformed services. NOAA is authorized for 500 NOAA Corps officers, including flag officers. The NOAA Corps has the skills to plan, prepare, and execute the acquisition of environmental and scientific data on land, at sea, and in the air. It supports all NOAA's Line Offices, NOAA Headquarters, and the Department, and commands the NOAA fleet.

In an effort to better align OMAO's budget structure with its intended purpose and improve budget clarity, NOAA is proposing to change the name of one of its programs, projects, and activities (PPAs) within the Procurement, Acquisition and Construction (PAC) account from Fleet Capital Improvement and Technology Infusion to Platform Capital Improvement and Technology Infusion. In recent years, the budget has only included funding for vessel related activities in the Fleet Capital Improvement and Technology

Infusion PPA because aircraft funding for these depot-level maintenance activities is not required annually. In years where aircraft funds are required for this activity, some of the funds in this PPA would support the aircraft sub-PPA. For example, in FY 2022, NOAA is requesting funds for Service Depot Level Maintenance on its P-3 Hurricane Hunter Aircraft. This flexibility is important to allow NOAA to meet its aircraft maintenance needs when they do arise.

Significant Adjustments:

Inflationary Adjustments
NOAA's FY 2022 Base includes a net increase of $9,121,000 and 0 FTE / 0 positions to account for the full funding requirement for certain inflationary adjustments to current programs for OMAO activities. This includes the estimated 2022 civilian pay raise of 2.7 percent and military pay raise of 2.7 percent, as well as inflationary increases for labor and non-labor activities including benefits and rent charges from the General Services Administration (GSA).

Technical Adjustments
NOAA requests the following transfers for a change of $0 and 0 FTE/ 0 positions to the agency:

From Office	Subactivity	To Office	Subactivity	Amount
NOS	Navigation, Observations, and Positioning	OMAO	NOAA Commissioned Officer Corps	$2,044,000 / 18 FTE / 18 Positions
NOS	Coastal Science, Assessment, Response and Restoration	OMAO	NOAA Commissioned Officer Corps	$319,000 / 4 FTE / 4 Positions
NOS	Sanctuaries and Marine Protected Areas	OMAO	NOAA Commissioned Officer Corps	$563,000 / 2 FTE / 2Positions
NMFS	Fisheries Data Collections, Surveys, and Assessments	OMAO	NOAA Commissioned Officer Corps	$1,562,000 / 13 FTE / 13 Positions
OAR	Climate Laboratories & Cooperative Institutes	OMAO	NOAA Commissioned Officer Corps	$261,000 / 2 FTE / 2 Positions

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OAR	Ocean Laboratories and Cooperative Institutes	OMAO	NOAA Commissioned Officer Corps	$390,000 / 3 FTE / 3 Positions
OAR	Ocean Exploration and Research	OMAO	NOAA Commissioned Officer Corps	$130,000 / 1 FTE / 1 Positions
OAR	Sustained Ocean Observations and Monitoring	OMAO	NOAA Commissioned Officer Corps	$130,000 / 1 FTE / 1 Positions
NWS	Observations	OMAO	NOAA Commissioned Officer Corps	$324,000 / 2 FTE / 2 Positions
NWS	Central Processing	OMAO	NOAA Commissioned Officer Corps	$346,000 / 2 FTE / 2 Positions
NWS	Analyze, Forecast and Support	OMAO	NOAA Commissioned Officer Corps	$54,000 / 1 FTE / 1 Positions
NESDIS	Satellite and Product Operations	OMAO	NOAA Commissioned Officer Corps	$277,000 / 2 FTE / 2 Positions
NESDIS	Product Development, Readiness & Application	OMAO	NOAA Commissioned Officer Corps	$276,000 / 2 FTE / 2 Positions
MS	Mission Services and Management	OMAO	NOAA Commissioned Officer Corps	$661,000 / 4 FTE / 4 Positions

NOAA requests to transfer a total of $7,337,000 and 57 FTE / 57 positions to OMAO's NOAA Commissioned Officer Corps PPA to allow for better alignment of funding and greater transparency over the full cost of the NOAA Corps. With this transfer, funding for all NOAA Corps personnel will reside within OMAO. This increases efficiency within the program by reducing administrative burdens and allows NOAA to better manage personnel requirements consistent with the NOAA Corps Amendments Act of 2020.

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TRANSFER CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: NOAA Commissioned Officer Corps
Subactivity: NOAA Commissioned Officer Corps (ORF) - transfer from Multple PPAs (ORF)

	Object Class	2021 Enacted	2022 Transfer	2022 Base
11.1	Full-time permanent compensation	1,543	0	1,585
11.3	Other than full-time permanent	0	0	0
11.5	Other personnel compensation	24	0	25
11.7	Military personnel compensation	32,370	7,337	40,581
11.9	Total personnel compensation	33,937	7,337	42,191
12	Civilian personnel benefits	4,648	0	4,773
13	Benefits for former personnel	322	0	322
21	Travel and transportation of persons	275	0	275
22	Transportation of things	1,035	0	1,035
23	Rent, communications, and utilitites	0	0	0
23.1	Rental payments to GSA	0	0	0
23.2	Rental Payments to others	0	0	0
23.3	Communications, utilities and misc charges	0	0	0
24	Printing and reproduction	3	0	3
25.1	Advisory and assistance services	1,769	0	1,393
25.2	Other services from non-Federal sources	0	0	0
25.3	Other goods and services from Federal sources	0	0	0
25.4	Operation and maintenance of facilities	0	0	0
25.5	Research and development contracts	0	0	0
25.6	Medical care	0	0	0
25.7	Operation and maintenance of equipment	0	0	0
25.8	Subsistence and support of persons	0	0	0
26	Supplies and materials	11	0	11
31	Equipment	0	0	0
32	Lands and structures	0	0	0
33	Investments and loans	0	0	0
41	Grants, subsidies and contributions	0	0	0
42	Insurance claims and indemnities	0	0	0
43	Interest and dividends	0	0	0
44	Refunds	0	0	0
99	Total obligations	42,000	7,337	50,003

*The 2022 Base column reflects the full 2022 base for the subactivity, including calculated ATBs and any additional transfers

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PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS
(Dollar amounts in thousands)

		2020 Actuals		2021 Enacted		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
OFFICE OF MARINE AND AVIATION OPERATIONS (OMAO)											
Marine Operations and	Pos/BA	726	194,622	628	165,926	628	172,831	649	193,974	21	21,143
Maintenance	FTE/OBL	822	203,666	596	165,926	596	172,831	611	193,974	15	21,143
Aviation Operations and Aircraft	Pos/BA	114	37,603	72	31,987	72	33,126	82	36,700	10	3,574
Services	FTE/OBL	115	37,846	72	31,987	72	33,126	79	36,700	7	3,574
Autonomous Uncrewed	Pos/BA	6	12,562	9	13,665	9	14,076	11	15,576	2	1,500
Technology Operations	FTE/OBL	6	10,006	9	13,665	9	14,076	10	15,576	1	1,500
NOAA Commissioned Officer Corps	Pos/BA	0	0	288	42,000	345	50,003	355	53,373	10	3,370
	FTE/OBL	0	0	288	42,000	345	50,003	355	53,373	10	3,370
TOTAL OMAO - ORF	**Pos/BA**	**846**	**244,787**	**997**	**253,578**	**1,054**	**270,036**	**1,097**	**299,623**	**43**	**29,587**
	FTE/OBL	**943**	**251,518**	**965**	**253,578**	**1,022**	**270,036**	**1,055**	**299,623**	**33**	**29,587**
Marine and Aviation Capital	Pos/BA	17	97,806	30	123,500	30	123,500	30	305,500	0	182,000
Investments	FTE/OBL	33	105,991	30	123,500	30	123,500	30	305,500	0	182,000
TOTAL OMAO - PAC	**Pos/BA**	**17**	**97,806**	**30**	**123,500**	**30**	**123,500**	**30**	**305,500**	**0**	**182,000**
	FTE/OBL	**33**	**105,991**	**30**	**123,500**	**30**	**123,500**	**30**	**305,500**	**0**	**182,000**
Medicare Eligible Retiree Health	Pos/BA	0	1,497	0	1,591	0	1,617	0	1,617	0	0
Care Fund	FTE/OBL	0	1,497	0	1,591	0	1,617	0	1,617	0	0
NOAA Corps Commissioned	Pos/BA	0	30,102	0	30,770	0	31,790	0	31,790	0	0
Officers Retirement	FTE/OBL	0	29,748	0	30,770	0	31,790	0	31,790	0	0
TOTAL OMAO	**Pos/BA**	**863**	**374,192**	**1,027**	**409,439**	**1,084**	**426,943**	**1,127**	**638,530**	**43**	**211,587**
	FTE/OBL	**976**	**388,754**	**995**	**409,439**	**1,052**	**426,943**	**1,085**	**638,530**	**33**	**211,587**

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(Dollars amounts in thousands)

Activity: Marine Operations and Maintenance

Goal Statement

Support present and future NOAA data collection requirements, maximize the service life of the NOAA Fleet through maintenance and repair, support NOAA's prioritized ship requirements through execution of the annual Fleet Allocation Plan (FAP), increase utilization of the NOAA Fleet, and maintain safe and efficient operations through required and developmental training.

Base Program

Marine Operations and Maintenance supports centralized management for NOAA's research and survey vessels, which operate throughout the world supporting multiple missions including climate research, fisheries research, nautical charting and ocean research. Given the diverse portfolio of NOAA Line Office Program requirements and responsibilities, a single vessel type cannot meet all of NOAA's mission requirements. Thus, NOAA ships range from large oceanographic research vessels capable of exploring the world's deepest oceans, to smaller ships responsible for charting the shallow bays and inlets of the United States.

Marine Operations is based in Newport, Oregon, and manage OMAO's three Marine Centers located in Norfolk, Virginia, Newport, Oregon, and Honolulu, Hawaii, and additional port offices. It also supports marine operation activities in Headquarters, including the Small Boat program and the Dive Center program.

Statement of Operating Objectives

Schedule and Milestones:
FY 2022 - FY 2026

- Integrate Fleet Maintenance Plan based on Material Condition Assessments for each vessel and developed through close collaboration with American Bureau of Shipping
- Ensure Operational Readiness Training for all ship personnel is completed (show training requirements on the NOAA FAP)
- Uphold safety standards on all NOAA vessels
- Execute 95 percent of approved Days at Sea (DAS) in the FAP, less any DAS lost for weather or removed from the schedule at the request of NOAA Line Office Programs
- Perform program funded and reimbursable DAS as scheduled in the FAP

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Deliverables:

FY 2022

- Provide approximately 2,500 DAS, to include mission and non-mission base funded, program funded and reimbursable funded days to all NOAA Line Offices (85 percent utilization rate)
- Survey 1,029 Square Nautical Miles in support of NOS hydrographic survey activities
- More detailed deliverables are determined on a project-by-project basis as documented in the FAP

FY 2023 - FY 2026

- Meet annual ship schedules and milestones as outlined in the FAP

Explanation and Justification

		2020 Actuals		2021 Enacted		2022 Base	
Comparison by subactivity		Personnel	Amount	Personnel	Amount	Personnel	Amount
Marine Operations and Maintenance	Pos/BA	726	194,622	628	165,926	628	172,831
	FTE/OBL	822	203,666	596	165,926	596	172,831
Total Marine Operations and Maintenance	Pos/BA	726	194,622	628	165,926	628	172,831
	FTE/OBL	822	203,666	596	165,926	596	172,831

Activities funded under Marine Operations and Maintenance include the repair and maintenance of NOAA ships necessary to meet the rigorous demands of NOAA's scientific and regulatory missions. Regular maintenance, including proper preventive maintenance, is scheduled to ensure readiness prior to and during the field season.

This funding allows OMAO to provide ships capable of meeting prioritized, geographical and temporal, at-sea NOAA requirements. NOAA's Fleet Council uses input from across NOAA to define these requirements and inform ship schedules, as captured in the

FAP. The FAP details the objective and duration of individual NOAA projects, outlines the annual schedule and milestones to be achieved as agreed to and signed by the NOAA Fleet Council, and identifies OMAO scheduled repair and maintenance periods on NOAA ships.

As part of the preventative maintenance process, Marine Operations continues to implement a Material Condition Assessment (MCA) Program. The MCA is an in-depth survey that will uncover additional maintenance items that have become apparent between major maintenance cycles. MCAs will funnel items directly into work packages for repair periods in order to correct deficiencies and ensure items are addressed before they impact fleet readiness. MCAs are conducted by Marine Operations engineering personnel with assistance from NOAA's fleet inspection team and ship's crew.

Funds also support unscheduled maintenance costs, which can be attributed to the aging of NOAA’s fleet. These costs can include unplanned maintenance requirements discovered while completing scheduled operational maintenance; scheduled repairs requiring more extensive work than planned initially; costs in excess of the standard 20 percent estimated cost overrun; and urgent responses to machinery or equipment casualties.

NOAA vessels must adhere to safety and emissions requirements and regulations established by a variety of organizations. The American Bureau of Shipping certifies ships as seaworthy. OMAO uses their rules to design its maintenance program and conduct Ship Structure and Machinery Evaluations on the NOAA Fleet. Under the Clean Air Act, the Environmental Protection Agency issues regulations governing airborne emissions that affect ship engine and exhaust components. The U.S. Coast Guard issues regulations on all discharges from ships to ensure marine environments are protected from harmful discharges.

In FY 2022, OMAO will provide approximately 2,500 DAS to support NOAA’s highest-priority requirements. DAS may include OMAO base funded days, DAS funded by other NOAA Line Office programs, and DAS funded by Agencies external to NOAA, as determined during the year of budget execution, based on the availability of vessels and funds. NOAA estimates base funded DAS annually based on a variety of factors including maintenance, staffing, training, outfitting, fuel, and other costs necessary to support reliable and safe ship operations. Program funded DAS are established through Service Level Agreements with NOAA Line Office programs as well as reimbursable agreements with other agencies.

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(Dollars amounts in thousands)

The following table outlines the diversity of the active NOAA Fleet and primary mission areas of each vessel:

Ship					
Rainier	231 ft.	Ocean	2	Newport, OR	1967
Fairweather	231 ft.	Ocean	2	Ketchikan, AK	1967
Oregon II	170 ft.	Regional	1	Pascagoula, MS	1967
Oscar Elton Sette	224 ft.	Ocean	3	Honolulu, HI	1987
Okeanos Explorer	224 ft.	Ocean	1, 2	Newport, RI	1988
Gordon Gunter	224 ft.	Ocean	1	Pascagoula, MS	1989
Nancy Foster	187 ft.	Ocean	1	Charleston, SC	1990
Thomas Jefferson	208 ft.	Ocean	2	Norfolk, VA	1991
Ronald H. Brown	274 ft.	Global	3	Charleston, SC	1996
Oscar Dyson	209 ft.	Ocean	1	Kodiak, AK	2003
Henry B. Bigelow	209 ft.	Ocean	1	Newport, RI	2005
Pisces	209 ft.	Ocean	1	Pascagoula, MS	2007
Bell M. Shimada	209 ft.	Ocean	1	Newport, OR	2008
Ferdinand R. Hassler	124 ft.	Regional	2	New Castle, NH	2009
Reuben Lasker	209 ft.	Ocean	1	San Diego, CA	2012

Mission 1: Assessment and Management of Living Marine Resources
Mission 2: Charting and Mapping
Mission 3: Oceanographic Monitoring, Research, and Modeling

In addition to vessel management, Marine Operations and Maintenance supports the following activities:

NOAA Dive Program: The NOAA Dive Center provides diver certification, technical advice, and a standardized equipment program. The NOAA Dive Center, in cooperation with the NOAA Diving Control and Safety Board, issues safe diving standards and practices, according to the Standards of Training, Certification and Watch keeping for Seafarers and the International Maritime Organization conventions. NOAA maintains approximately 369 divers who perform over 14,000 dives annually in support of NOAA's mission. Fleet divers help maintain NOAA's ships with tasks such as cleaning propellers and sea strainers, surveying hulls for damage, and installing transducers. NOAA divers' work also includes installation of observing systems such as tide gauges. Scientists trained as divers study and describe the habitats and species that NOAA is mandated to protect and manage. These activities enable NOAA to meet requirements and mandates, enhance customer service and operational safety, and facilitate self-sufficiency at sea.

NOAA Small Boat Program: The Small Boat Program is designed to reduce risk, promote standardization, and enhance the safety of NOAA's small-boat operations. It enforces the policy of the safety program and ensures compliance through onsite inspections, risk assessments and marine incident investigations. NOAA maintains over 400 small boats, which are operated and funded within the Line Offices. The Small Boat Program provides technical and marine engineering assistance to Line Office field units as needed and to the NOAA Small Boat Safety Board to ensure compliance with the NOAA Small Boat Standards and Procedures Manual requirements.

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Marine Operations and Maintenance	Pos./BA	628	172,831	649	192,500	21	19,669
	FTE/OBL	596	172,831	611	192,500	15	19,669

Days at Sea Increase (+$19,669, +15 FTE/+21 Positions) – NOAA requests an increase for additional Days at Sea (DAS), improving the utilization of the NOAA fleet in support of NOAA's growth in data collection requirements. NOAA will also improve diversity, inclusion, and quality of life aboard NOAA vessels through investment in personnel and training. As ships operate at a higher tempo, investing in ship maintenance will be critical to executing the Fleet Allocation Plan and meeting the rigorous demands of NOAA's scientific and regulatory missions.

The NOAA Fleet operates throughout the world supporting a wide array of NOAA missions including: climate research, fisheries research, nautical charting, and specialized atmospheric and ocean research. In response to increased requests for additional DAS within NOAA and from external partners, growth of DAS may include missions such as servicing buoys and moorings used to observe and detect long term climate change - the Tropical Atmosphere Ocean Array, the Prediction and Research moored Array in the Tropical Atlantic, ocean acidification moorings; mapping coral reef ecosystems, coral reef monitoring and artificial reef assessment to help with both ecosystem response and resilience to climate change; nautical charting and acquisition of high level bathymetry in the Bering Sea, Alaska, the Juan de Fuca straits and SE Alaska, approaches to the port of Wilmington, NC and to New York City harbor; stock assessments in the Bering Sea and the Gulf of Alaska and Spring plankton surveys in the Gulf of Mexico. The UxS program also includes a request in FY 2022 (OMAO p-33 for UxS operations program) for DAS to expand testing of uncrewed systems and serve as a force multiplier from the ships to meet data requirements.

The increase supports a long-term investment in NOAA's fleet. In order to increase DAS, NOAA will need to increase variable operating funds, as well as staffing aboard NOAA vessels. Variable operating costs include: fuel, general maintenance when ships are underway, overtime, readiness supplies, uninhabitable lodging, and Very Small Aperture Terminal (VSAT). Additional wage marine and engineering staff, both permanent and on rotational assignment, as well as crew augmenters, necessary to fill open positions during vacancies or leave, will be needed to maintain a safe ship environment, providing backup relief to permanent crew members, and ensuring a viable quality of life for mariners. NOAA's primary focus when hiring new crew members will be to create a

more diverse and inclusive workforce aboard vessels.

This increase will support NOAA's ship to shore capability for the VSAT satellite network, a two-way ground station that transmits and receives data from satellites. With this investment, ship communication and data transmission capability will enhance sharing of scientific data, helping to ensure reliable delivery of data, regardless of size and scope. The increase enables NOAA to leverage new and evolving satellite solutions to maximize bandwidth management for a changing fleet size and increasing data applications. NOAA will also be able to utilize the advancements in telepresence and sharing of data realized during COVID.

In FY 2022, NOAA will also begin preliminary staffing for NOAA vessel *Oceanographer.* The participation of engineers in the construction phase of the vessel is important so that they better understand both design of the ship and the ship's systems.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022

- Introduce new training curriculum for NOAA ship crew members
- Begin staffing NOAA Vessel *Oceanographer*
- Support VSAT ship to shore capacity

Deliverables:
FY 2022

- Execute 2,945 DAS, an increase of 545 DAS
- Improve collaboration and sharing of scientific data through increased VSAT capacity

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Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Days at Sea					
With Increase	2,945	2,945	2,945	2,945	2,945
Without Increase	2,500	2,400	2,300	2,200	2,100
Outyear Costs:					
Direct Obligations	19,669	19,669	19,669	19,669	19,669
Capitalized	0	0	0	0	0
Uncapitalized	19,669	19,669	19,669	19,669	19,669
Budget Authority	19,669	19,669	19,669	19,669	19,669
Outlays	12,195	12,195	12,195	12,195	12,195
FTE	15	21	21	21	21
Positions	21	21	21	21	21

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PROGRAM CHANGE PERSONNEL DETAIL

Activity: Marine Operations and Maintenance
Subactivity: Marine Operations and Maintenance
Program Change: Days at Sea Increase

Title		Grade	Number	Annual Salary	Total Salaries
General Engineer		ZP-IV	1	157,614	157,614
Part-time Engineer		ZP-IV	1	153,000	153,000
Chief Engineer		WM-01	1	157,614	157,614
Port Engineer		ZP-IV	1	153,000	153,000
Vessel Support Assistant		ZS-IV	2	70,336	140,672
Chief Boatswain		WM-01	3	89,072	267,216
Able Seaman		WM-02	3	59,612	178,835
Electronic Technician		ZT-IV	2	102,000	204,000
Survey Technician		WM-12	3	58,835	176,506
1st Asst Engineer		WM-01	4	136,432	545,730
Total			21		2,134,187
Less lapse	-25.00%		(6)		(533,547)
Total full-time permanent (FTE)			15		1,600,640
2022 Pay Adjustment (2.7%)					43,217
					1,643,857

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	15
Total FTE	15
Authorized Positions:	
Full-time permanent	21
Total Positions	21

Exhibit 15

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National Oceanic and Atmospheric Administration
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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Marine Operations and Maintenance
Subactivity: Marine Operations and Maintenance

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	58,000	37,982	40,000	41,644	1,644
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	11,700	13,095	14,000	14,641	641
11.8	Special personnel services payments	620	0	0	0	0
11.9	Total personnel compensation	70,320	51,077	54,000	56,285	2,285
12	Civilian personnel benefits	18,000	16,595	18,500	19,075	575
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	4,045	3,332	3,992	4,252	260
22	Transportation of things	1,580	590	615	625	10
23	Rent, communications, and utilitites	7,080	7,085	7,250	7,250	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	800	800	800	820	20
24	Printing and reproduction	70	50	50	50	0
25.1	Advisory and assistance services	80,041	68,500	68,500	80,500	12,000
25.2	Other services from non-Federal sources	1,730	0	0	0	0
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	18,500	16,548	17,724	21,743	4,019
31	Equipment	1,500	1,349	1,400	1,900	500
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	203,666	165,926	172,831	192,500	19,669

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Marine Operations and Maintenance	Pos./BA	628	172,831	628	174,031	0	1,200
	FTE/OBL	596	172,831	596	174,031	0	1,200

Office of Health Services Increase (+$1,200, 0 FTE/0 Positions) – NOAA requests an increase for the Office of Health Services (OHS), to expand NOAA's ability to address behavioral and mental health within the workforce. This increase will allow NOAA to contract health professionals and support the expansion of this program throughout NOAA. The additional resources will help build and shape a total worker wellness program for the agency.

NOAA will also develop and begin the implementation of a program management plan for these activities. OHS program management will identify components of OMAO's health service program that can translate NOAA-wide, as well as the unique behavioral and mental health needs of the entire NOAA workforce.

OHS is committed to the occupational health, safety, and readiness of all people diving, flying and sailing, while utilizing OMAO platforms and facilities throughout the world. Currently, OHS is staffed by U.S. Public Health commissioned health officers who work to maximize deployment readiness and minimize medically related disruptions to fleet, aircraft, and diving operations. OHS programs assess and promote mental and physical readiness. OHS is responsible for preventing and containing disease in both nearby and geographically remote operational environments. Medical officers use their expertise, specialized training, and experience in the assessment, prevention, and treatment of urgent and emergent medical problems that especially prevalent in high-risk operational environments. Most importantly, OHS is dedicated to advocating for the physical and mental health and safety of individuals in all workplaces.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022
- Supplement current health officers by contracting with health professionals.
- Develop Health Services program management plan

Deliverables:
FY 2022
- Implement NOAA Health Services plan to improve the management of Health Services throughout the NOAA workforce
- Address behavioral and mental health on NOAA platforms throughout the NOAA community
- Advocacy for physical and mental health of NOAA workforce in all workplaces

Performance Measures	2022	2023	2024	2025	2026
Health Services program management plan					
With Increase	yes	yes	yes	yes	yes
Without Increase	no	no	no	no	no
Outyear Costs:					
Direct Obligations	1,200	1,200	1,200	1,200	1,200
Capitalized	0	0	0	0	0
Uncapitalized	1,200	1,200	1,200	1,200	1,200
Budget Authority	1,200	1,200	1,200	1,200	1,200
Outlays	744	744	744	744	744
FTE	0	0	0	0	0
Positions	0	0	0	0	0

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Marine Operations and Maintenance
Subactivity: Marine Operations and Maintenance

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	58,000	37,982	40,000	40,000	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	11,700	13,095	14,000	14,000	0
11.8	Special personnel services payments	620	0	0	0	0
11.9	Total personnel compensation	70,320	51,077	54,000	54,000	0
12	Civilian personnel benefits	18,000	16,595	18,500	18,500	0
13	Benefits for former personnel	4,045	0	0	0	0
21	Travel and transportation of persons	0	3,332	3,992	3,992	0
22	Transportation of things	1,580	590	615	615	0
23	Rent, communications, and utilitites	7,080	7,085	7,250	7,250	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	800	800	800	800	0
24	Printing and reproduction	70	50	50	50	0
25.1	Advisory and assistance services	80,041	68,500	68,500	69,700	1,200
25.2	Other services from non-Federal sources	1,730	0	0	0	0
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	18,500	16,548	17,724	17,724	0
31	Equipment	1,500	1,349	1,400	1,400	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	203,666	165,926	172,831	174,031	1,200

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Marine Operations and Maintenance	Pos./BA	628	172,831	628	174,031	0	1,200
	FTE/OBL	596	172,831	596	174,031	0	1,200

Enterprise Infrastructure Solutions (EIS) (+$200, 0 FTE/0 Positions) - This increase will enable NOAA to conduct a technology modernization and support an accelerated transition of telecommunications services to the GSA EIS contract vehicle. DOC currently uses GSA's Networx, Washington Interagency Telecommunications System 3, and regional contracts to acquire telecommunication services. These contracts expire in May 2023. Between now and then, DOC will be transitioning telecommunications services to the GSA EIS follow-on contract. Additional EIS requests can also be found in Mission Support (MS-65), NOS (NOS-48, NOS-88, NOS-120, and NOS-149), NMFS (NMFS-71), NWS (NWS-24, NWS-127, and NWS-182), NESDIS (NESDIS-37), and OMAO (OMAO-19).

The modernization enables NOAA to re-architect its network infrastructure to gain efficiencies and resilience, realize significantly reduced costs for network services after transition, and minimize risk as legacy services are discontinued. Increased funding will accelerate the transition and enable NOAA to: (a) contract for engineering services to re-architect the network infrastructure and establish detailed transition plans; (b) issue awards for new hardware and telecommunication services; (c) trench and lay new lines, decommission and provision circuits; and (d) establish funding for administrative services to provide ordering, invoice processing, and inventory management. By expediting the technology modernization and migration to the new EIS vendors, NOAA will realize significant reductions in price and cost-avoidance. This funding will reduce risks related to service delivery and operations due to termination of GSA legacy service contracts.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022 - 2026
- Award NOAA task orders under EIS to support modernization needs

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

- Establish a sustainable, resilient architecture to meet NOAA's current and planned needs
- Transition 100% NOAA Legacy GSA inventory to EIS

Deliverables:

- Modernized telecommunications infrastructure capable of meeting the agency's mission
- Provide a centralized ordering and management platform
- Provide a secure infrastructure resistant to extreme weather impacts

Performance Measures	2022	2023	2024	2025	2026
Transition of NOAA Telecommunication services to GSA's EIS					
With Increase	35%	60%	80%	100%	0%
Without Increase	20%	45%	55%	65%	75%
*Assumes full funding of EIS initiatives NOAA-wide					
Outyear Costs:					
Direct Obligations	200	200	200	200	200
Capitalized	0	0	0	0	0
Uncapitalized	200	200	200	200	200
Budget Authority	200	200	200	200	200
Outlays	200	200	200	200	200
FTE	0	0	0	0	0
Positions	0	0	0	0	0

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Marine Operations and Maintenance
Subactivity: Marine Operations and Maintenance

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	58,000	37,982	40,000	40,000	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	11,700	13,095	14,000	14,000	0
11.8	Special personnel services payments	620	0	0	0	0
11.9	Total personnel compensation	70,320	51,077	54,000	54,000	0
12	Civilian personnel benefits	18,000	16,595	18,500	18,500	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	4,045	3,332	3,992	3,992	0
22	Transportation of things	1,580	590	615	615	0
23	Rent, communications, and utilitites	7,080	7,085	7,250	7,250	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	800	800	800	800	0
24	Printing and reproduction	70	50	50	50	0
25.1	Advisory and assistance services	80,041	68,500	68,500	68,700	200
25.2	Other services from non-Federal sources	1,730	0	0	0	0
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	18,500	16,548	17,724	17,724	0
31	Equipment	1,500	1,349	1,400	1,400	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	203,666	165,926	172,831	173,031	200

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JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollars amounts in thousands)

Activity: Aviation Operations and Aircraft Services

Goal Statement

Provide centralized aircraft systems management and coordination of all airborne activity, support NOAA's prioritized airborne requirements through execution of the Aircraft Allocation Plan (AAP), and safely modify, maintain, and operate NOAA aircraft.

Base Program

NOAA's Aviation Operations and Aircraft Services provide scientists with airborne platforms equipped with comprehensive data collection systems that are capable of assessing severe weather, coastal and marine resources, and the dynamics of complex ecosystems and their climate induced changes. Among their missions, NOAA's diverse and versatile aircraft fly into hurricanes to help predict their track and intensity. They also collect snow water equivalent measurements for forecasting water supplies and spring flooding, species data critical to managing commercial and recreational fish stocks and air chemistry data critical for public health. NOAA aircraft are capable of carrying specialized sensors for coastal mapping and shallow-water bathymetric data collection, providing essential data to nautical charting and safe navigation.

Statement of Operating Objectives

Schedule and Milestones:
FY 2022 – FY 2026
- Perform base funded, program funded and reimbursable Flight Hours as scheduled in the AAP

Deliverables:
FY 2022
- Provide approximately 5,527 flight hours[1] to include an estimated 3,387 mission and non-mission base funded hours and 2,140 program and reimbursable funded hours to all NOAA Line Offices
- Detailed deliverables are determined on a project-by-project basis as documented in project flight instructions

[1] Flight hour estimates assume non-hurricane hours are distributed between heavy and light aircraft as they were in the FY 2021 Signed Aircraft Allocation Plan. Heavy aircraft cost more than light aircraft to fly so changes in that distribution can cause significant variations in NOAA estimates.

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FY 2023 - FY 2026

- Meet annual aircraft schedules and milestones as outlined on the AAP
- Maintain NOAA aircraft to continue to provide data to NOAA programs

Explanation and Justification

Comparison by subactivity		2020 Actuals Personnel	2020 Actuals Amount	2021 Enacted Personnel	2021 Enacted Amount	2022 Base Program Personnel	2022 Base Program Amount
Aviation Operations and Aircraft Services	Pos/BA	114	37,603	72	31,987	72	33,126
	FTE/OBL	115	37,846	72	31,987	72	33,126
Total Aviation Operations and Aircraft Services	Pos/BA	114	37,603	72	31,987	72	33,126
	FTE/OBL	115	37,846	72	31,987	72	33,126

OMAO's Aircraft Operations Center (AOC), located at the Lakeland Linder Regional Airport in Lakeland, Florida, operates NOAA's Aircraft Fleet in support of NOAA's mission to understand and predict changes in climate, weather, oceans and coasts, and to assist in conserving and managing coastal and marine ecosystems and resources. The aircraft operate throughout the United States and around the world over open oceans, mountains, coastal wetlands, and the Arctic. AOC provides capable, mission-ready aircraft and professional crews to safely meet NOAA's scientific and operational mission requirements by assisting with coastal mapping, flood prediction, hurricane prediction modeling, marine mammal population assessments, coastal erosion surveys, oil spill investigations and air quality studies.

AOC flight crews operate in some of the world's most demanding flight regimes, including flying into the eye of a hurricane and at low altitudes over mountainous terrain and open ocean areas. Each aircraft requires a minimum number of qualified NOAA Corps pilots to conduct operations safely and efficiently. OMAO continues efforts to recruit and retain pilots to reduce excessive administrative burdens and time away from base. OMAO also ensures that contracted aviation operations are conducted safely by providing technical support, services, and equipment to NOAA Line Office programs.

In FY 2022, AOC will provide approximately 5,527 flight hours in support of NOAA scientific airborne requirements. Demands for time

aboard NOAA aircraft are prioritized by the NOAA Fleet Council and outlined in the AAP. These include base funded hours and additional flight hours, which may be funded by programs during the year of budget execution, based on funding and aircraft availability. NOAA's aircraft also perform non-mission hours including training, calibration, and maintenance flights. These hours ensure AOC can safely and accurately collect data in support of NOAA's scientific missions. Program funded flight hours can support any NOAA mission approved by the Fleet Council, including hurricane surveillance and reconnaissance, and are established through Service Level Agreements with NOAA programs, and reimbursable agreements with other agencies. The AAP details the objective and duration of individual NOAA projects and identifies OMAO scheduled repair and maintenance periods on specific NOAA aircraft.

NOAA's aircraft are versatile and can conduct a variety of missions. The following table outlines the diversity of the NOAA aircraft and primary mission areas of each one:

Aircraft				
N42RF	WP-3D	135,000	3	45
N43RF	WP-3D	135,000	3	45
N49RF	G-IV-SP	74,600	3	26
N57RF	DHC-6-300 Twin Otter	12,500	1, 3	39
N56RF	DHC-6-300 Twin Otter	12,500	1, 3	38
N48RF	DHC-6-300 Twin Otter	12,500	1, 3	39
N46RF	DHC-6-300 Twin Otter	12,500	1, 3	35
N68RF	King Air 350ER	16,500	2	11
N67RF	King Air 350ER	16,500	2	1

Mission 1: Assessment and Management of Living Marine Resources
Mission 2: Charting and Surveying
Mission 3: Weather Forecasting, Research, and Modeling

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Aviation Operations and Aircraft Services	Pos./BA	72	33,126	82	36,687	10	3,561
	FTE/OBL	72	33,126	79	36,687	7	3,561

Increased Aircraft Operations (+3,561, 7 FTE/10 Positions) – This request will strengthen NOAA's ability to meet current and growing demands for airborne data requirements resulting from climate-induced changes by increasing staffing and flight hours. As climate change results in floods and droughts, spurs more frequent and more intense hurricanes, alters the distribution of fisheries, and threatens coastal resources, scientists and decision-makers increasingly require data from NOAA aircraft to inform products and services for the Nation. Combined with additional pilots (OMAO-41), enhanced staffing and flight hours will enable NOAA to collect more and better data to understand and mitigate the impacts of climate change.

Additional staff will enable NOAA to better meet demand for data during increasingly active hurricane seasons, maximizing the critical data sets that only NOAA aircraft can collect. Currently NOAA only has two P-3 crews. Legal requirements for crew rest and working hour limitations prevent around the clock missions for the single crew assigned to each P-3. An additional crew will enable NOAA to rotate crews with little aircraft downtime, closing data gaps in hurricane forecasting, fully leveraging the capabilities of NOAA aircraft data collection critical to accurate hurricane forecasts, and allowing NOAA to support more climate research missions. Crewmembers consist of pilots, flight crew and critical ground support personnel. Increased staffing will improve maintenance, increasing the reliability of NOAA's aircraft. It will improve NOAA's ability to collect climate observations, enabling better climate modeling and aiding in the reduction and mitigation of severe weather and climate change events.

An increase of 488 base-funded flight-hours will enable NOAA to increase operations on critical climate-related missions, including snow survey, air chemistry, marine mammal observations, and coastal mapping missions. NOAA line offices depend on data collected from NOAA aircraft to make environmental assessments, as well as aid in the observation and mitigation of climate change. Funds will support the cost of additional flight hours, including increased maintenance and operational support required to sustain operations at this level. This increase will expand NOAA's ability to provide world-class data and information to support America's response to the threat of global climate change.

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(Dollar amounts in thousands)

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022
- Hire additional crew
- Increase operations on critical climate-related missions

FY 2023-FY 2026
- Make P-3s available for around the clock hurricane surveillance missions

Deliverables:
- 488 additional base-funded flight hours
- Increased aircraft support for climate-related missions, including snow survey, air chemistry, marine mammal observations, and coastal mapping missions
- Increased operational tempo on hurricane surveillance missions, up to 24 hour operations
- Reduced Hurricane Hunter downtime due to crew rotations

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(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Flight Hours					
With Increase/Decrease	6,000	6,000	6,000	6,000	6,000
Without Increase/Decrease	5,527	5,527	5,527	5,527	5,527
Outyear Costs:					
Direct Obligations	3,561	3,561	3,561	3,561	3,561
Capitalized	0	0	0	0	0
Uncapitalized	3,561	3,561	3,561	3,561	3,561
Budget Authority	3,561	3,561	3,561	3,561	3,561
Outlays	2,208	2,208	2,208	2,208	2,208
FTE	7	10	10	10	10
Positions	10	10	10	10	10

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Aviation Operations and Aircraft Services
Subactivity: Aviation Operations and Aircraft Services
Program Change: Increased Aircraft Operations

Title		Grade	Number	Annual Salary	Total Salaries
Flight Engineer		GS-12	2	89,114	178,228
Crew Chief		GS-12	1	89,114	89,114
Assistant Crew Chief		GS-11	1	74,349	74,349
Aircraft Technician		GS-12	1	89,114	89,114
Electronics Technician		GS-11	2	74,349	148,698
Flight Director/Meteorologist		GS-13	2	105,965	211,930
Electronics Engineer		GS-13	1	105,965	105,965
Total			10		897,398
Less lapse	25.00%		(3)		(224,350)
Total full-time permanent (FTE)			7		673,049
2022 Pay Adjustment (2.7%)	2.70%				18,172
					691,221

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	7
Authorized Positions:	
Full-time permanent	10
Total Positions	10

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National Oceanic and Atmospheric Administration
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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Aviation Operations and Aircraft Services
Subactivity: Aviation Operations and Aircraft Services

	Object Class	2020 Enacted	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	11,620	7,005	7,194	7,885	691
11.3	Other than full-time permanent	7	0	0	0	0
11.5	Other personnel compensation	504	340	340	340	0
11.8	Special personnel services payments	409	15	15	15	0
11.9	Total personnel compensation	12,540	7,360	7,549	8,240	691
12	Civilian personnel benefits	2,542	2,634	2,705	2,947	242
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	1,215	2,041	2,041	2,165	124
22	Transportation of things	284	222	222	251	29
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	2,074	2,538	2,538	2,749	211
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	4	2	2	2	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	12,318	11,872	11,872	13,437	1,565
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	6,428	4,978	5,857	6,526	669
31	Equipment	290	333	333	363	30
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	150	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	1	7	7	7	0
44	Refunds	0	0	0	0	0
99	Total obligations	37,846	31,987	33,126	36,687	3,561

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollars amounts in thousands)

Activity: Autonomous Uncrewed Technology Operations (AUTO)

Goal Statement

Provide centralized coordination, support and guidance for uncrewed marine and aircraft systems across NOAA. Evaluate emerging uncrewed systems technologies for acquisition and induction into operations. Determine where opportunities exist to more cost-effectively carry out NOAA mission-critical activities.

Base Program

The Uncrewed Systems (UxS) Operations Center provides centralized UxS management and standardization of safety, training, inspections, and operational reviews and is responsible for the strategic planning of UxS acquisition and operations within NOAA, consistent with NOAA's priorities and data needs. UxS technology encompasses a wide range of platforms, from very small UxS such as uncrewed aerial drones, to large multi-million dollar surface and underwater marine systems designed to operate in remote locations for extended periods of time. UxS include Uncrewed Aircraft Systems (UAS), Uncrewed Marine Systems (UMS) surface and underwater vehicles, and Remote Operated Vehicles. The technology continues to evolve rapidly and is invaluable in supporting NOAA prioritized mission requirements such as hydrographic and habitat mapping, fishery stock assessment, and oceanographic and atmospheric observations that support weather forecasting and extreme weather events.

OMAO will continue to partner with OAR to develop new technologies and applications of uncrewed systems to cost effectively meet NOAA's missions. The NOAA uncrewed systems executive oversight board (co-chaired by OAR and OMAO) will continue to coordinate UxS activities between line offices.

Statement of Operating Objectives

Schedule and Milestones:
FY 2022 – FY 2026

- Continue to assess the application of UAS and UMS platforms to meet NOAA's scientific and operational mission requirements
- Develop data quality and management guidelines to ensure the timely processing and availability of UxS data to NOAA line offices and the public

- Continue development of safety, training, operational, privacy and cyber requirements
- Continue development of UxS capabilities to include Beyond Visual Line of Site, and data collection in remote environments
- Provide operational support to all field locations including Newport, OR, Newport, RI, Gulfport, MS, and Lakeland, FL
- Continue collaborative partnerships with other Federal agencies, academia, and industry
- Standardize UxS deployment from NOAA ships and from shore
- Plan UxS acquisitions within NOAA
- Provide UAS operational approvals, airworthiness inspections, standardization of training, and coordination of airspace approvals

Deliverables:

FY 2022 – FY 2026

- Establish the long-term OMAO UMS Operations Center in Gulfport, MS
- UAS pilot/operator support to NOAA Line Offices
- Acquisition expertise and guidance, to include oversight of the purchase and/or lease of proven UxS
- Funding, operational, and technical support of UxS projects in support of NOAA prioritized requirements
- Payload development and integration
- Safety and compliance with aviation regulations and policy

Explanation and Justification

		2020 Actuals		2021 Enacted		2022 Base Program	
Comparison by subactivity		Personnel	Amount	Personnel	Amount	Personnel	Amount
Autonomous Uncrewed	Pos/BA	6	12,652	9	13,665	9	14,076
Technology Operations	FTE/OBL	6	10,006	9	13,665	9	14,076
Total Autonomous Uncrewed	Pos/BA	6	12,652	9	13,665	9	14,076
Technology Operations	FTE/OBL	6	10,006	9	13,665	9	14,076

The UxS program promotes the safe, efficient and economical operation of UxS that NOAA uses to collect high-quality environmental data for the agency's science, products and services. It centrally manages and standardizes safety, training, inspections, and

operational reviews for UxS technologies. It is responsible for the strategic planning of UxS acquisition within NOAA, consistent with NOAA's priorities and data needs. NOAA currently uses UxS for seafloor and habitat mapping, ocean exploration, marine mammal and fishery stock assessments, emergency response, and at-sea observations that improve forecasting of extreme events, such as harmful algal blooms and hypoxia.

Since its establishment in 2020, OMAO's UxS Operations Center has pivoted NOAA's investment in UxS from research to operations. Its services include training, cybersecurity, payload integration, airworthiness evaluations, operational planning, acquisition and other expert support to ensure safe, cost-effective operations across the agency. The Center also supports efforts across NOAA to use UxS of all types. This year, OMAO, in collaboration with the OAR and the UxS Executive Oversight Board, also provided over $3 million to projects across NOAA to evaluate emerging technologies, determine where opportunities exist to more cost effectively carry out NOAA's mission-critical activities using UxS, and deploy these systems rather than using existing means. More than 50 projects applied for the program requesting $18 million. With UxS funds, programs across NOAA have used UxS to assess protected species, develop under-ice ecosystem observations, ecosystem monitoring, survey hydrologic and storm damages, validate satellite data, collect data on coastal change, and improve hurricane intensity prediction. Additionally, NOAA provided nearly $3 million to existing UxS efforts with external government, industry, and academic partners.

The program also helps meet the objectives of the Commercial Engagement Through Ocean Technology Act of 2018, which requires NOAA to coordinate research, assess and acquire UMS with the U.S. Navy, other Federal agencies, industry and academia. NOAA is establishing a new UMS Center in Gulfport, MS that will advance the use of UMS data across NOAA through partnerships, training, research, and testing.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Autonomous Uncrewed Technology Operations	Pos./BA	9	14,076	11	15,576	2	1,500
	FTE/OBL	9	14,076	10	15,576	1	1,500

Autonomous Uncrewed Technology Operations ($1,500, 1 FTE/2 Positions) - NOAA requests an increase for the Uncrewed Systems Operations Center (UxSOC) to train personnel, refine requirements, and maintain new platforms for climate-related projects. This will also fund sea days on NOAA ships to support evaluation and integration work for the new multi-mission uncrewed marine surface system and other UxS. When combined with the $2.5 million requested to acquire a multi-mission uncrewed system (OMAO-66), this represents a core, baseline capability for the UxSOC to support climate, mapping, and fisheries missions.

Development and application of uncrewed systems are integral to NOAA's climate research, ocean mapping, and fishery stock assessment requirements; significant development and evaluation work is required to most effectively apply these emerging technologies. Additional funding will support staffing to operate and maintain the new platforms as well as train OMAO personnel in their operations. UxSOC will train personnel, refine requirements, and develop concepts of operations and procedures for further UMS operations in these fields. In addition, one of the largest hurdles to operationalizing UxS is the cost of sea days required to support the integration of UxS into existing operations. Providing dedicated sea days for UxS integration will provide a major accelerant for transitioning NOAA missions onto UxS platforms.

This operational support will enable NOAA to effectively use new platforms to understand and mitigate the impacts of climate change. The associated people and platforms will support fisheries stock assessments, including improving understanding of how distribution and abundance of commercially important fish populations are responding to warming and changing ocean environments. This is particularly important to underserved, remote and climate-vulnerable Arctic communities that rely on fisheries resources for subsistence and economic opportunity. They will also support a wide range of NMFS, NOS, and OAR climate-related ocean research and surveys. OMAO will continue to partner with OAR to develop new technologies and applications of uncrewed systems to cost effectively meet NOAA's missions. The NOAA uncrewed systems executive oversight board (co-chaired by OAR and OMAO) will continue to coordinate UxS activities between line offices.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022
- Hire staff to operate and maintain new platforms
- Oversee the acquisition of new platforms
-

FY 2022-2026
- Train OMAO personnel to operate new platforms
- Perform 60 additional sea days dedicated to UxS integration activities
- Refine UxS requirements for climate missions
- Maintain new platforms
- Support climate research, ocean mapping and fishery stock assessments

Deliverables:
- Baseline uncrewed system operational capacity for climate, mapping and fisheries missions

Performance Measures	2022	2023	2024	2025	2026
Days at Sea for UxS integration					
With Increase	60	60	60	60	60
Without Increase	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Outyear Costs:					
Direct Obligations	1,500	1,500	1,500	1,500	1,500
Capitalized	0	0	0	0	0
Uncapitalized	1,500	1,500	1,500	1,500	1,500
Budget Authority	1,500	1,500	1,500	1,500	1,500
Outlays	1,085	1,085	1,085	1,085	1,085
FTE	1	2	2	2	2
Positions	2	2	2	2	2

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: Autonomous Uncrewed Technology Operations
Subactivity: Autonomous Uncrewed Technology Operations
Program Change: Autonomous Uncrewed Technology Operations

Title		Grade	Number	Annual Salary	Total Salaries
Engineer		ZP-3	2	85,762	171,523
Total			2		171,523
Less lapse	25.00%		(1)		(42,881)
Total full-time permanent (FTE)			1		128,642
2022 Pay Adjustment (2.7%)					3,473
					132,116

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	1
Total FTE	1
Authorized Positions:	
Full-time permanent	2
Total Positions	2

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Autonomous Uncrewed Technology Operations
Subactivity: Autonomous Uncrewed Technology Operations

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	628	515	554	686	132
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	8	15	15	15	0
11.7	Military Personnel	0	0	0	0	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	636	530	569	701	132
12	Civilian personnel benefits	278	189	211	257	46
12	Military personnel benefits	0	0	0	0	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	75	254	261	461	200
22	Transportation of things	341	18	19	194	175
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	46	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	7	4	4	4	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	4,506	11,033	11,331	11,331	0
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	627	45	46	593	547
31	Equipment	540	220	226	626	400
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	2,950	1,372	1,409	1,409	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	10,006	13,665	14,076	15,576	1,500

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollars amounts in thousands)

Activity: NOAA Commissioned Officer Corps

Goal Statement

Provide centralized human resources support for all active duty NOAA Commissioned Officer Corps (NOAA Corps) officers. Provide the commensurate pay and benefits, accession, relocation, training, and military Human Resources (HR) support and policy functions that are unique to operating a uniformed service. Provide highly specialized workforce component that have the skills to plan, prepare, and execute the acquisition of environmental and scientific data on land, at sea, and in the air.

Base Program

The NOAA Corps is one of the Nation's eight uniformed services. NOAA Corps officers command NOAA's fleet of ship and aircraft and support all NOAA's Line Offices, NOAA Headquarters, and the Department. They manage research projects, conduct diving operations, and serve in NOAA staff positions to fulfill NOAA's mission requirements. This activity supports the actual cost of the NOAA Corps Mission Program's support functions, including most of the pay and benefits, as well as accession, relocation, training, promotions, separations, Tricare payments, and HR support for NOAA Corps officers working across all NOAA Line Office programs.

Statement of Operating Objectives

Schedule and Milestones:
FY 2022 – FY 2026

- Recruit NOAA Corps officers for two Basic Officer Training Classes consisting of up to 20 candidates in each class
- Coordinate assignment changes and permanent change of station moves for NOAA Corps officers across all of NOAA
- Track and administer the medical requirements of active duty officers
- Conduct workforce planning to ensure the authorized strength is maintained at peak operating levels

Deliverables:
FY 2022 – FY 2026

- Transparent NOAA Corps mission program that is externally recognizable and operationally meaningful
- Additional NOAA Corps officers recruited to serve across all NOAA Line Offices
- NOAA Corps assignment changes are executed and officers are in place across all NOAA Line Offices to meet NOAA's

mission requirements

- Medical readiness of active duty officers is maintained

Explanation and Justification

Comparison by subactivity		2020 Enacted Personnel	2020 Enacted Amount	2021 Enacted Personnel	2021 Enacted Amount	2022 Base Program Personnel	2022 Base Program Amount
NOAA Commissioned Officer Corps	Pos/BA	0	0	288	42,000	345	50,003
	FTE/OBL	0	0	288	42,000	345	50,003
Total NOAA Corps	Pos/BA	0	0	288	42,000	345	50,003
	FTE/OBL	0	0	288	42,000	345	50,003

* NOAA Corps was a new activity proposed in FY 2021. In FY 2020, NOAA Corps funds were embedded within the Marine Operations and Maintenance, Aviation Operations and Aircraft Services, and Uncrewed System Operations activities.

The NOAA Corps is one of NOAA's critical mission programs. It strives to integrate leadership, experience, and technology to optimize NOAA's mission of science, service and stewardship at home and around the world. NOAA Corps officers are NOAA's operational leaders and are an integral part of NOAA's workforce. They operate and manage NOAA's fleet of ships and aircraft, serve in positions of leadership and command in NOAA and the Department of Commerce, and essential positions in other agencies as well as in the military during times of war or national emergency.

Centrally managed within OMAO's Commissioned Personnel Center in Silver Spring, MD., the NOAA Corps provides a unique and valuable capability to the Nation, and NOAA Corps officers provide a responsiveness and flexibility inherent in a commissioned personnel system. NOAA Corps officers serve throughout the agency's Line and Staff Offices to support nearly all of NOAA's programs and missions. The combination of commissioned service and scientific expertise makes the NOAA Corps uniquely capable of leading some of NOAA's most important initiatives. The NOAA Corps provides a cadre of professionals trained in engineering, earth sciences, oceanography, meteorology, fisheries science, and other related disciplines. More information on the NOAA Corps can be found at https://www.omao.noaa.gov/learn/noaa-corps/about.

The NOAA Corps Workforce Plan currently under development, assesses the current and future end strength requirements of the NOAA Corps to carry out its mission of protecting lives, livelihoods, and valuable natural resources for the American public by

commanding and operating NOAA's fleets of ships and aircraft to meet at-sea and airborne data collection requirements. It also identifies best management practices, based on proven practices used by NOAA and other uniformed services, to extend and sustain the capabilities provided by the NOAA Corps. Operational end strength needs are driven by ship and aircraft fleet sizes and workforce needs, and are established at the levels necessary to safely and effectively accomplish mission and performance objectives.

While the NOAA Corps serves across all of NOAA, it is funded out of OMAO. Funding in this activity supports the pay and benefits, accession, relocation, training and military HR support and policy functions unique to operating a uniformed service. Funds for retired NOAA Corps officers are appropriated in the mandatory NOAA Corps Commissioned Officers Retirement funds (see OMAO-77), and the Medicare Eligible Retiree Health Care Fund discretionary account (see OMAO-83).

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
NOAA Commissioned Officer Corps	Pos./BA	345	50,003	355	52,573	10	2,570
	FTE/OBL	345	50,003	352	52,573	7	2,570

NOAA Corps Officers (+$2,570, 7 FTE/10 Positions) - This request will strengthen NOAA's ability to meet current and growing demands for airborne and marine data requirements resulting from climate-induced changes by hiring ten additional NOAA Corps Officers, consisting of eight aviators and two Marine Officers. As climate change results in floods and droughts, spurs more frequent and intense hurricanes, alters the distribution of fisheries, and threatens coastal resources, scientists and decision-makers increasingly require data from NOAA aircraft and ships to inform products and services for the Nation.

Coupled with enhanced operational support (OMAO-25), additional pilots will improve NOAA's ability to collect climate observations, enabling better climate modeling and aiding in the reduction and mitigation of severe weather and climate change events. Staffing constraints currently limit NOAA's ability to collect airborne data. As a result, NOAA often extends pilot deployments, and removes officers from positions in NOAA Line Offices to fly missions. This model is not sustainable or efficient. An increase in the number of pilots will shorten deployments, result in a healthier workforce, and increase pilot retention.[2]

The participation of NOAA Corps officers in the construction phase of N/V *Oceanographer* will provide the officers that are assigned to the ship a better understanding of both ship design and systems and will enable them to convey that knowledge to the ship's crew. Once *Oceanographer* is added to NOAA's current fleet of 15 vessels, NOAA will be better prepared to respond to requests for additional DAS in support of a wide array of NOAA missions including: climate research, fisheries research, nautical charting, and specialized atmospheric and ocean research.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

[2] Congress limits the days that a Department of Defense (DOD) service member may be away from their duty station because extended deployments impact retention. In FY 2019, 21% of NOAA pilots exceeded the DOD limit.

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Schedule and Milestones:
FY 2022
- Hire and train additional pilots
- Hire two officers to begin staffing NOAA Vessel *Oceanographer*

FY 2023 - FY2026
- Make P-3s available for around the clock hurricane surveillance missions
- Provide officers a clear understanding of ship design and construction before the ship is operational

Deliverables:
FY 2022
- Increased pilot retention
- More reliable support for NOAA Line Offices

FY 2023 - FY2026
- Reduced Hurricane Hunter downtime due to crew rotations
- Officers able to take command as soon as ship becomes operational

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National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Additional NOAA Corps Officers					
With Increase	10	10	10	10	10
Without Increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	2,570	2,570	2,570	2,570	2,570
Capitalized	0	0	0	0	0
Uncapitalized	2,570	2,570	2,570	2,570	2,570
Budget Authority	2,570	2,570	2,570	2,570	2,570
Outlays	1,874	1,874	1,874	1,874	1,874
FTE	7	10	10	10	10
Positions	10	10	10	10	10

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE PERSONNEL DETAIL

Activity: NOAA Commissioned Officer Corps
Subactivity: NOAA Commissioned Officer Corps
Program Change: Increased NOAA Corps Officers

Title		Grade	Number	Annual Salary	Total Salaries
Captain		O-6	1	206,734	206,734
Commander		O-5	1	161,919	161,919
Lieutenant Commander		O-4	2	150,961	301,922
Lieutenant		O-3	2	125,702	251,404
Lietenant (Junior Grade)		O-2	2	105,849	211,698
Ensign		O-1	2	84,537	169,074
Total			10		1,302,751
Less lapse	25.00%		(3)		(325,688)
Total full-time permanent (FTE)			7		977,064
2022 Pay Adjustment (2.7%)					1,003,444

Personnel Data Summary	
Full-time Equivalent Employment (FTE)	
Full-time permanent	7

Authorized Positions:	
Full-time permanent	10
Total Positions	10

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: NOAA Commissioned Officer Corps
Subactivity: NOAA Commissioned Officer Corps

	Object Class	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	0	1,543	1,585	1,585	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	24	25	25	0
11.8	Special personnel services payments	0	32,370	40,581	41,584	1,003
11.9	Total personnel compensation	0	33,937	42,191	43,194	1,003
12	Civilian personnel benefits	0	4,648	4,773	5,350	577
13	Benefits for former personnel	0	322	322	322	0
21	Travel and transportation of persons	0	275	275	275	0
22	Transportation of things	0	1,035	1,035	1,035	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	0	3	3	3	0
25.1	Advisory and assistance services	0	1,769	1,393	1,921	528
25.2	Other services from non-Federal sources	0	0	0	243	243
25.3	Other goods and services from Federal sources	0	0	0	220	220
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	0	11	11	11	0
31	Equipment	0	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	0	42,000	50,003	52,574	2,571

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		Personnel	Amount	Personnel	Amount	Personnel	Amount
NOAA Commissioned Officer Corps	Pos./BA	345	50,003	345	50,803	0	800
	FTE/OBL	345	50,003	345	50,803	0	800

NOAA Corps Recruitment (+$800, 0 FTE/0 Positions) - This request will allow NOAA to accelerate and improve NOAA Corps recruitment levels, with a focus on leveraging programs to underserved communities and building partnerships with Minority Serving Institutions (MSIs) and Historically Black Colleges and Universities (HBCUs) to improve diversity. A NOAA Corps that reflects the population will better understand and meet the needs of the community. An inclusive environment will improve individual and organizational performance and result in better value to customers and other stakeholders. Through these partnerships, NOAA will expand internships and scholarships within the aviation, marine and uncrewed workforce for all positions. NOAA will also begin executing provisions contained in the NOAA Commissioned Officer Corps Amendments Act of 2020 such as pre-commissioned education assistance programs and the repayment of education loans for students with critical skills.

NOAA's cutting-edge climate forecasting and service delivery, coupled with a robust approach to diversity, equity and inclusion, position the agency as a critical leader to make tangible improvements to vulnerable communities. NOAA is aligned with the Administration priority of environmental justice and equity and will further support EO 13985 by laying the framework and foundations for successfully integrating equity across the organization to reach a broader range of Americans in underserved or disadvantaged communities.

Schedule and Milestones:
FY 2022
- Accelerate recruitment levels to strengthen diversity
- Build partnerships with HBCUs
- Begin precommissioned education assistance program

FY 2023 - FY2026
- Expand internships and scholarships through HBCU partnerships

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Deliverables:
FY 2022
- Increase diversity within the rising Basic Officer Training Class (BOTC)
- Repayment of NOAA Corps education loans

FY 2023 - FY2026
- Increase diversity of the NOAA Corps workforce

Performance Measures	2022	2023	2024	2025	2026
Repayment of Education Loans					
With Increase	25%	50%	75%	100%	100%
Without Increase	0%	0%	0%	0%	0%
Outyear Costs:					
Direct Obligations	800	800	800	800	800
Capitalized	0	0	0	0	0
Uncapitalized	800	800	800	800	800
Budget Authority	800	800	800	800	800
Outlays	800	800	800	800	800
FTE	0	0	0	0	0
Positions	0	0	0	0	0

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(Direct Obligations amounts in thousands)

Activity: NOAA Commissioned Officer Corps
Subactivity: NOAA Commissioned Officer Corps

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	0	1,543	1,585	1,585	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	0	24	25	25	0
11.8	Special personnel services payments	0	32,370	40,581	40,581	0
11.9	Total personnel compensation	0	33,937	42,191	42,191	0
12	Civilian personnel benefits	0	4,648	4,773	4,773	0
13	Benefits for former personnel	0	322	322	322	0
21	Travel and transportation of persons	0	275	275	275	0
22	Transportation of things	0	1,035	1,035	1,035	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	0	3	3	3	0
25.1	Advisory and assistance services	0	1,769	1,393	1,393	0
25.2	Other services from non-Federal sources	0	0	0	800	800
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	0	11	11	11	0
31	Equipment	0	0	0	0	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	0	42,000	50,003	50,803	800

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Activity: Marine and Aviation Capital Investments

Goal Statement

Acquire effective and efficient aircraft and ship platforms to support NOAA's prioritized airborne and at-sea data requirements, maintain NOAA's current fleet at a higher state of readiness, and advance coastal and worldwide ocean survey and data collection through investment in new vessel construction.

Base Program

The Marine and Aviation Capital Investments activity includes three major Programs: Platform Capital Improvements and Technology Infusion, and Vessel Recapitalization and Construction, and Aircraft Recapitalization and Construction. Each program plays a specific part in ensuring the continued health of NOAA's vessel and aircraft fleet to ensure the continued support of NOAA's mission requirements.

Statement of Operating Objectives

Platform Capital Improvements and Technology Infusion
Schedule and Milestones:
FY 2022 – FY 2026

- Perform phased overhauls, upgrades, and replacements of ship's systems through infrastructure improvement plans
- Restore and replace ship mission systems
- Address ship corrosion
- Develop and execute long-term maintenance plans to achieve the operational service life of all NOAA vessels

Deliverables:
FY 2022 – FY 2026

- Improve the reliability of the fleet and reduce lost Days at Sea from unscheduled maintenance
- Ensure the continued capability of the NOAA Fleet
- Attain the planned operational service life of all vessels

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Vessel Recapitalization and Construction
Schedule and Milestones:
FY 2022
- Begin Construction of N/V *Discoverer*
- Begin Construction of N/V *Oceanographer*
- Continue requirements analysis for N/V Class C

FY 2023
- Begin construction of N/V Class B

FY 2024
- Initial operating capability for N/V *Discoverer*[3]

FY 2025
- Initial operating capability for N/V *Oceanographer*
- Begin detail design of N/V Class C

FY 2026
- Initial operating capability for first N/V Class B
- Begin Construction of N/V Class C
- Contract close out and full operating capability for the N/V *Oceanographer* and *Discoverer*

Deliverables:
FY 2022 – FY 2026
- N/V *Oceanographer*
- N/V *Discoverer*

[3] Initial operating capability indicates the beginning of the warranty/post-shakedown availability (PSA) period in which limited operations will be conducted.

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Aircraft Recapitalization and Construction
Schedule and Milestones:
FY 2022
- Continue G-550 instrumentation
- Initiate effort to acquire a second high-altitude jet

FY 2023
- Continue to provide oversight over high altitude acquisition
- Initiate acquisition of a 3rd King Air
- Initiate acquisition of a 2nd Twin Otter
- Complete requirements analysis for P-3 Replacements

FY 2024
- Delivery of the G-550
- Continued oversight of second high-altitude jet acquisition
- Complete NOAA modifications for the King Air
- Complete NOAA modifications for the Twin Otter
- Calibrate the Twin Otter

FY 2025
- Calibrate the King Air
- Induct the King Air into NOAA's fleet
- Induct the Twin Otter into NOAA's fleet

Deliverables:
FY 2024
- One G-550

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Out-year Funding Estimates ($ in Thousands):

Platform Capital Improvements & Tech Infusion	2021 & Prior	2022	2023	2024	2025	2026	CTC	Total
Change from 2022 Base	N/A	70,500	10,000	2,500	2,500	2,500	TBD	TBD
Total Request	131,357	95,500	35,000	27,500	27,500	27,500	TBD	TBD

Vessel Recapitalization and Construction	2021 & Prior	2022	2023	2024	2025	2026	CTC	Total
Change from 2022 Base	N/A	0	0	0	0	0	TBD	TBD
Total Request	455,050	75,000	75,000	75,000	75,000	75,000	TBD	TBD

Aircraft Recapitalization and Construction	2021 & Prior	2022	2023	2024	2025	2026	CTC	Total
Change from 2022 Base*	N/A	115,000	TBD	TBD	TBD	TBD	TBD	TBD
Total Request	162,000	135,000	TBD	TBD	TBD	TBD	TBD	TBD

*2022 Base reflects reversion to pre-reprogramming 2021 level of $20,000, due to one-time nature of reprogramming

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Explanation and Justification

Comparison by subactivity		2020 Actuals Personnel	2020 Actuals Amount	2021 Enacted Personnel	2021 Enacted Amount	2022 Base Personnel	2022 Base Amount
Platform Capital Improvements & Tech	Pos/BA	9	22,882	13	25,000	13	25,000
	FTE/OBL	11	23,130	13	25,000	13	25,000
Vessel Recapitalization and Construction	Pos/BA	8	74,924	13	63,500	13	63,500
	FTE/OBL	15	9,606	13	63,500	13	63,500
Aircraft Recapitalization and Construction	Pos/BA	0	0	4	35,000	4	35,000
	FTE/OBL	7	73,255	4	35,000	4	35,000
Total Marine and Aviation Capital Investments	Pos/BA	17	97,806	30	123,500	30	123,500
	FTE/OBL	33	105,991	30	123,500	30	123,500

PLATFORM CAPITAL IMPROVEMENTS AND TECHNOLOGY INFUSION

The Platform Capital Improvements and Technology Infusion Program allows NOAA to plan and perform cyclic depot-level capital investments across the fleet, designed to maintain and extend the service life of NOAA's vessel and aircraft fleet. It ensures that the required upgrades to aircraft and ship-board systems and mission equipment comply with safety requirements and the needs of the programs. Aircraft and ships receive regular upgrades and replacements of mission support equipment and technology infusions such as data processing and storage capacity, multi-beam sonars and sensors. The program will also support the future acquisition of UxS, and uncrewed launch and recovery systems beginning in FY 2022.

OMAO monitors the material condition of aircraft through periodic Service Life Assessments (SLAs) and Service Life Extension Programs. The SLA documents completed for all aircraft in FY 2016 by a third-party vendor provide key data on maintenance costs and trends; sustainability costs; reliability metrics and issues; all of which guide future capital investment decision making. In addition, OMAO uses manufacturer provided Service Life Extension costs such as re-winging, major overhauls and upgrades to help determine economic feasibility, cost benefit and reliability data. These data are critical to maximizing future maintenance investments and capital investments.

For vessels, OMAO monitors their material condition through Ship Structure and Machinery Evaluation (SSME). The SSMEs document the results of inspections and identify future work requirements to guide capital investment decision making. Additionally, OMAO uses manufacturer-provided information for new ships to develop maintenance profiles. To address regular capital improvements for NOAA ships, progressive lifecycle maintenance ensures the service life of vessels by proactively overhauling, upgrading, or replacing shipboard systems before they fail. Repairs completed through progressive lifecycle maintenance improve the material condition of the ships, provide sustained critical technology refresh, and ensure NOAA ships remain capable of collecting environmental data to support NOAA's mission to provide accurate and reliable products services critical for national security, public safety, and economic security.

The chart below lists the types of capital investments that vary from year-to-year based on the results of SSMEs that assess the material condition of the ships and determine priority repairs:

Crew Space Refurbishment	Science/ Mission Space Refurbishment	Shipboard Systems	Underwater Body	Mission Systems Refresh
Refrigeration systems HVAC refurbishment Renovation of habitability spaces	Renovation of laboratory spaces Modifications to allow for emerging technologies	Propulsion & generation systems overhaul Re-piping Fire suppression upgrades Machinery monitoring upgrades Environmental equipment replace	Blast hull Refurbish props/shafts Refurbish valves/ piping	Multi-beam sonars and sensors Ship-board electronic data processing and storage UxS Launch/ Recovery System Small boats and launches Cranes, winches, davits

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VESSEL RECAPITALIZATION AND CONSTRUCTION

Acquisition of new ships is the best way for NOAA to reliably and consistently sustain its at-sea data collection capability. NOAA's Fleet Plan, released in 2016, assesses NOAA's at-sea observational infrastructure needs through 2028 for carrying out its mission of protecting lives, livelihoods, and valuable natural resources for the American public. It identifies an integrated approach consisting of best management practices and long-term recapitalization levers to extend and sustain capabilities. The plan includes the critical long-term strategy of designing and constructing up to eight new ships specifically designed to meet NOAA core capability requirements based on mission and activities.

Since releasing the Fleet Plan, NOAA has made concerted efforts to strengthen its knowledge of the condition of the fleet. Material condition assessments paired with the American Bureau of Shipping SLAs have resulted in better confidence in the condition of NOAA ships; that and increased funding have improved the readiness of the fleet. As a result of these efforts and other best practices, the end of service lives for many of NOAA's ships have been extended from the dates published in the 2016 Fleet Plan. However, the trend of condition deterioration remains the same. To most efficiently meet its prioritized data requirements, NOAA needs new purpose-designed and constructed vessels.

NOAA's ships need to be multi-mission adaptable and provide the infrastructure and capabilities necessary to meet mission requirements now and in the future. In contrast to the wide variety of vessel types that currently comprise the NOAA Fleet, NOAA intends to reduce the number of ship classes in the future. Each class will focus on a core mission with secondary missions that make the best use of the vessel's capabilities. The table below identifies the primary and secondary missions met by each ship. NOAA will standardize core equipment as much as possible and incorporate the latest technologies across the Fleet. Up to date technology and standardization are critical for NOAA to sustain optimal crewing and efficient operations and maintenance.

The Vessel Recapitalization and Construction program supports vessel acquisition, including instrumentation specific to NOAA missions. The program oversees these activities, which include a rigorous analysis of mission requirements, design, and alternative options to meet prioritized requirements. The new ship acquisition process consists of four phases: requirements analysis, concept design, preliminary design, and detail design and construction. These phases are immediately followed by warranty and fleet introduction activities before the ship is ready for full operation. Efforts will be made throughout the process to leverage design aspects of previous ship classes and to create standardization across the Fleet to meet multiple core mission requirements.

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Ship	Primary Mission	Secondary Mission(s)
N/V Class A	Oceanographic Monitoring, Research and Modeling	Assessment and Management of Living Marine Resources (no trawl); Charting and Surveying
N/V Class B	Charting and Surveying	Assessment and Management of Living Marine Resources (no trawl); Oceanographic Monitoring, Research and Modeling
N/V Class C	Assessment and Management of Living Marine Resources (trawl-capable, shallow-draft)	Charting and Surveying
N/V Class D	Assessment and Management of Living Marine Resources (trawl capable, near-shore and deep ocean, longer endurance)	Charting and Surveying; Oceanographic Monitoring, Research and Modeling

Progress on NOAA's Fleet Plan has helped put NOAA on a steady path toward a more reliable fleet that supports NOAA's science needs. In FY 2022, construction will begin on the first two vessels in NOAA's Fleet Plan—the NOAA Ships *Oceanographer* and *Discoverer.* These ships will be NOAA Class A vessels (also known as NOAA AGOR variant) with primary missions of oceanographic monitoring, research and modeling. The *Oceanographer* will be homeported in Honolulu, Hawaii, filling a gap left by the *N/V Hi'alakai,* which was decommissioned on December 15, 2020. The *Discoverer* will be assigned to Naval Station Newport, Rhode Island.

The FY 2022 funding will support acquisition of part of a Class B vessel, Class C requirements analysis and initial concept design, and on-going program management of Class A construction. Class A construction continues through an assisted acquisition funded prior to FY 2022. NOAA is on track to complete the requirements analysis phase for the N/V Class B in 2021. Requirements analysis and initial concept design for the N/V Class C is also underway. Class B vessels will be capable of conducting charting and surveying as primary missions, helping NOAA ensure safe navigation, while Class C vessels are trawl-capable ships that are mostly used for assessing and managing living marine resources.

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AIRCRAFT RECAPITALIZATION AND CONSTRUCTION

NOAA's aircraft are-and will continue to be-vital national assets for collecting observational data and providing critical products and services to government agencies, communities, and businesses around the country. Aircraft recapitalization is necessary for NOAA to keep its fleet of aircraft operational, and continue to provide essential services to the Nation, including accurate flood planning, hurricane forecasting, and data used by the Nation's emergency managers; fisheries data that supports the seafood and fishing industries; and hydrographic data to support safe navigation and maritime trade. These services affect individuals throughout the country and beyond, contributing to the Nation's $4.6 trillion seaport-generated economic activity and $200-billion fisheries industry.

NOAA published an aircraft recapitalization plan in October 2019. The 10-year plan outlines the need for people and aircraft to support NOAA's prioritized airborne requirements now and into the future. NOAA's aircraft are vital in collecting observational data in support of hurricane, water supply and weather forecasting, nautical charting, and fisheries management. Like NOAA's Fleet Plan, this plan sets the course for NOAA's future in aircraft observations. NOAA is already well on its way towards meeting requirements laid out in the Aircraft Plan. NOAA has already acquired one King Air 350 and anticipates the delivery of one Gulfstream 550 (G550) high altitude jet in 2024.

In addition to the requirements outlined in the NOAA Aircraft Plan, the Weather Research and Forecasting Innovation Act of 2017 mandates that NOAA provide back-up capability for its Hurricane Hunters. The G550 will conduct hurricane surveillance, which provides data that directly improves track forecasts by as much as 15 percent.[4] This hurricane surveillance mission is currently performed by the G-IV. Due to its age, the current G-IV reliability index is only 70 percent and this is forecast to decline to 55 percent reliability by 2024.[5] Before inducting the G550 into NOAA's fleet, NOAA still needs to test the aircraft, install remaining equipment, and calibrate systems to ensure the aircraft meet NOAA's standards and provide consistent data for scientific missions. NOAA currently has an agreement with NASA to utilize their aircraft if the G-IV is ever out of service.

[4] Aberson, S.D. 10 Years of Hurricane Synoptic Surveillance (1997-2006). Monthly Weather Review. May 2010, Vol. 138, No. 5.

[5] NOAA AOC Aircraft Fleet Plan Service Life Analysis, Gulfstream IV-SP Replacement Aircraft (Report AOC-FP-A4). August 3, 2016. Conklin & de Decker Associates, Inc.

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		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Platform Capital Improvement and Tech Infusion/Marine and Aviation Capital Investments	Pos./BA	13	25,000	13	88,000	0	63,000
	FTE/OBL	13	25,000	13	88,000	0	63,000

NOAA Ship *Ronald H. Brown* Mid-life Repair (+$63,000 0 FTE/0 Positions) – NOAA requests an increase to support the single phase mid-life repair of NOAA ship *Ronald H. Brown* (RB), which will extend the service life of the vessel.

The RB collects oceanographic and atmospheric data world-wide in direct support of climate-impacts, including data from buoys that drive accurate weather forecasts and climate models, and ocean acidification data that informs global carbon models. With these funds, the mid-life maintenance will be conducted in a single phase, which will minimize cost, reduce the time the ship is not available to collect data, and leverage the best practices from similar mid-life maintenance packages on sister ships. Upon completion of maintenance, the RB remaining expected life span will increase from 5 to 20 years, providing 15 more years of reliable and highly capable support for at-sea data collection.

In 2018, the RB, NOAA's largest oceanographic research vessel, completed a 243-day voyage throughout the Pacific, Atlantic and Indian Oceans to conduct scientific research and service buoys that inform global weather, climate and ocean forecasting. During the mission, the crew and scientists aboard the RB deployed, serviced and recovered more than 80 buoys that monitor ocean and weather conditions; collect plankton, and collected and analyzed more than 10,570 gallons of seawater to investigate changes in ocean chemistry.

The RB will be the 4th of the Auxiliary General Oceanographic Research (AGOR) class research vessels to enter mid-life repair. These ships include the *Thomas G. Thompson*, operated by University of Washington, *Roger Revelle*, operated by Scripps, and *Atlantis*, operated by Woods Hole Oceanographic Institution. NOAA will significantly reduce both technical risk and schedule risk by using the engineering, procurement strategies, and lessons-learned from the previous mid-life repairs on these sister ships. The mid-life repair includes: shipyard contract technical specifications; the repower or renewal of all the ship's service and propulsion diesel

engine generator sets; the renewal of the ship's main electric propulsion motors, including the associated automation and control systems, overhaul of the bow thruster, accommodation upgrades, piping renewals(fresh water generation upgrades); and the overhaul of Z-Drives and other science upgrades including the renewal of the entire ship's electronic network.

The posting of the Request for Proposal (RFP) from shipyards, along with a bidder ship check, will occur in the 3rd quarter of FY 2021. Receipt and evaluation of proposals will begin in Q4. Once the RB enters repair, NOAA will make every effort to mitigate the loss of the ship time during the repair period through the distribution of missions across the NOAA fleet and chartering outside vessels when needed.

Fleet maintenance and construction are critical to NOAA's ability to collect climate data. NOAA's fleet support activities are directly aligned with Administration priorities, including EO 14008, through support for a science-based climate response and Made in America initiatives to benefit the American economy.

Schedule and Milestones:
FY 2022
- Q2 – Final evaluation of shipyard proposals
- Q3 - Contract award

FY 2023 to FY 2026
- FY 2023 Q3 - RB enters the shipyard, dependent on long lead time materials
- FY 2024 Q3 - RB departs shipyard after completion of repair period
- FY 2024 Q4 - RB operational post sea trials

Deliverables:
- Continued long-term support of NOAA missions through the ship life extension of the RB

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Performance Measures	2022	2023	2024	2025	2026
Days at Sea post repair					
With Increase	N/A	N/A	N/A	240	240
Without Increase	N/A	N/A	N/A	220	200
Outyear Costs:					
Direct Obligations	63,000	0	0	0	0
Capitalized	63,000	0	0	0	0
Uncapitalized	0	0	0	0	0
Budget Authority	63,000	0	0	0	0
Outlays	22,050	22,050	18,900	0	0
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Ron Brown Mid-life Repair	**2021 & Prior**	**2022**	**2023**	**2024**	**2025**	**2026**	**CTC**	**Total**
Change from 2022 Base	0	63,000	0	0	0	0	N/A	63,000
Total Request	0	63,000	0	0	0	0	N/A	63,000

Exhibit 15

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PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Marine and Aviation Capital Investments
Subactivity: Platform Capital Improvements and Tech Infusion

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	855	855	855	855	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	80	80	80	80	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	935	935	935	935	0
12	Civilian personnel benefits	215	215	215	215	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	0	0
22	Transportation of things	22	22	22	22	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	18,000	19,000	19,000	72,550	53,550
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,000	1,500	1,500	4,650	3,150
31	Equipment	2,958	3,328	3,328	9,628	6,300
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	23,130	25,000	25,000	88,000	63,000

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		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Platform Capital Improvements and Technolog Infusion	Pos./BA	13	25,000	13	30,000	0	5,000
	FTE/OBL	13	25,000	13	30,000	0	5,000

P-3 Service Depot Level Maintenance (+5,000, 0 FTE/0 Positions) – This request will begin Service Depot Level Maintenance (SDLM) for NOAA's two P-3 Hurricane Hunter aircraft. This maintenance is required to maintain the aircraft's airworthiness certification, a legal requirement to fly. The P-3s are extremely important airborne tools for NOAA's climate products and services. They collect data that informs hurricane forecasts, fire predictions, tornado warnings and much more.

Funding is required in FY 2022 to ensure the aircraft are airworthy for the 2023 hurricane season. With additional funds, OMAO will conduct an inspection on the first P-3 and complete initial repairs as part of the SDLM. An additional $7.5 million will be required in FY 2023 for a total of $12.5 million to finish repairs on the first P-3, and to complete a SDLM on NOAA's second P-3. The maintenance completed will extend the service life of the aircraft through 2030.

Continued service of the aircraft is critical to observing changes in climate and aiding in forecasting major weather events. These forecasts and models provide emergency managers, policy-makers, industry, and scientific data users with the information they will need to respond to and mitigate the impacts of climate events.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022
- Compete Contract for P-3 SDLM
- Award contract for P-3 SDLM

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PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

FY 2023

- First aircraft arrives at maintenance facility, as soon as reasonably practicable given 2022 hurricane season
- Conduct SDLM inspection on first P-3
- Repair initial defects identified during inspection
- Maintenance progresses under oversight from AOC personnel

Deliverables:

- Successful maintenance on a critical hurricane surveillance aircraft
- Reduced downtime due to unscheduled maintenance and repairs
- Continued service life until 2030

Out-year Funding Estimates ($ in Thousands):

P-3 SDLM	**2021 & Prior**	**2022**	**2023**	**2024**	**2025**	**2026**	**CTC**	**Total**
Change from 2022 Base	0	5,000	7,500	0	0	0	N/A	12,500
Total Request	0	5,000	7,500	0	0	0	N/A	12,500

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
P-3 Flight Hours					
With Increase	644	644	644	644	644
Without Increase	644	0	0	0	0
Outyear Costs:					
Direct Obligations	5,000	7,500	0	0	0
Capitalized	5,000	7,500	0	0	0
Uncapitalized	0	0	0	0	0
Budget Authority	5,000	7,500	0	0	0
Outlays	1,750	4,375	6,375	0	0
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Marine and Aviation Capital Investments
Subactivity: Platform Capital Improvements and Technology Infusion

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	855	855	855	855	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	80	80	80	80	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	935	935	935	935	0
12	Civilian personnel benefits	215	215	215	215	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	0	0
22	Transportation of things	22	22	22	22	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	18,000	19,000	19,000	19,000	0
25.2	Other services from non-Federal sources	0	0	0	0	0
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,000	1,500	1,500	6,500	5,000
31	Equipment	2,958	3,328	3,328	3,328	0
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	23,130	25,000	25,000	30,000	5,000

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Platform Capital Improvements & Tech Infusion	Pos./BA	13	25,000	13	27,500	0	2,500
	FTE/OBL	13	25,000	13	27,500	0	2,500

Uncrewed Technology Acquisitions ($2,500, 0 FTE/0 Positions) - NOAA requests an increase for the Uncrewed Systems Operations Center (UxSOC) to purchase one multi-mission uncrewed marine surface system (UMS) for climate-related projects. Combined with operational funding (OMAO-33), this represents a core, baseline capability for the UxSOC to support climate-related mapping, ocean change, and fisheries missions.

Significant work is required for NOAA's climate research, ocean mapping, and fishery stock assessment missions to transition to uncrewed systems. Through proposals from NOAA programs, the UxSOC has seen demand for a UMS to meet missions across NOAA. However, before missions can transition to be fully operational, NOAA must integrate these UMS into ship-board operations. This integration work requires physical modifications to the ships, development of procedures and operational concepts, and training of personnel. The UMS acquired will be used to further these ship-board integration activities and develop an initial operating capability, informing future UMS acquisitions for stand-alone systems as well as systems integrated with new ships procured under NOAA's Fleet Recapitalization program. Procuring a multi-mission UMS for shipboard initial operational capability will allow the UxSOC to train personnel, refine requirements, and develop concepts of operations and procedures for further UMS operations in these fields. Once a full operational status is achieved, this platform will continue to serve as a baseline capability for supporting climate-related mapping and fisheries missions. It would also inform the acquisition of uncrewed systems for NOAA's planned new class of survey ships and ensure NOAA is ready to use uncrewed mapping systems when those ships are brought online.

Specifically, the multi-mission UMS would support improved efficiency and productivity of coastal mapping and fisheries stock assessments in support of NOS and NMFS missions. Coastal mapping supports climate resilience for ports and coastal communities and paves the way for ocean renewable energy. It is particularly important to improve coastal mapping in remote areas such as the Arctic where underserved populations are acutely vulnerable to sea level rise and a changing climate. Likewise, coastal mapping is fundamental to expand jobs in all maritime sectors.

UMS support fisheries stock assessments, including improving understanding of how commercially important fish populations are responding to warming and changing ocean environments. Again, this is particularly important to underserved, remote and climate-vulnerable Arctic communities that rely on fisheries resources for subsistence and economic opportunity.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022
- Acquire one UMS

Deliverables:
- One UMS
- Baseline uncrewed system capacity for climate-related mapping and fisheries missions

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Performance Measures	2022	2023	2024	2025	2026
Days at Sea for Uncrewed Systems					
With Increase	60	60	60	60	60
Without Increase	0	0	0	0	0
Outyear Costs:					
Direct Obligations	2,500	2,500	2,500	2,500	2,500
Capitalized	2,500	2,500	2,500	2,500	2,500
Uncapitalized	0	0	0	0	0
Budget Authority	2,500	2,500	2,500	2,500	2,500
Outlays	1,550	1,550	1,550	1,550	1,550
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Marine and Aviation Capital Investments
Subactivity: Platform Capital Improvements and Technology Infusion

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	855	855	855	855	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	80	80	80	80	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	935	935	935	935	0
12	Civilian personnel benefits	215	215	215	215	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	0	0	0	0	0
22	Transportation of things	22	22	22	22	0
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	0	0	0	0	0
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	18,000	19,000	19,000	19,000	0
25.2	Other services from non-Federal sources	0	0	0	0	0
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	1,000	1,500	1,500	1,500	0
31	Equipment	2,958	3,328	3,328	5,828	2,500
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	23,130	25,000	25,000	27,500	2,500

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Aircraft Recapitalization and Construction	Pos./BA	4	35,000	4	135,000	0	100,000
	FTE/OBL	4	35,000	4	135,000	0	100,000

Second Aircraft to Meet National Weather Research and Forecasting Needs (+$100,000, 0 FTE/0 Positions) – NOAA requests funding to bring a second specialized high-altitude Hurricane Hunter on-line to meet national needs as outlined in the Weather Research and Forecasting Innovation Act (the Weather Act).

This Act requires that NOAA have redundant capabilities for the high-altitude jet aircraft that fly through and around hurricanes, delivering data in near real-time for accurate track and intensity forecasts. The one element of the Weather Act NOAA cannot currently meet in-house is the redundancy for the high-altitude hurricane hunter; this increase would provide for that. NOAA currently meets this requirement through an agreement with a partner agency. However, this agreement only provides a back-up aircraft on a space-available basis (i.e. if the aircraft is not otherwise scheduled) and the data collection capabilities of the back-up aircraft is limited to dropwindsondes. The partner back-up aircraft does not have the capability to collect flight-level data system or Tail Doppler Radar data, which directly improves the accuracy of hurricane forecasts. The partner aircraft is limited in its ability to meet NOAA's growing demands for climate and atmospheric research and hurricane forecasting. Forecasts from the high-altitude jet directly inform evacuation guidance that impacts millions of Americans and trillions in property value. The increasing severity and frequency of hurricanes, as demonstrated by the record breaking 2020 season, coupled with NOAA aircrafts' unique ability to collect data that can be not be obtained by any other means, has placed increasing reliance and importance on NOAA's aircraft.

NOAA will allocate $20 million in base funds in addition to this increase for a total of $120 million in FY 2022 and will allocate and additional $3.7 million in FY 2023 for a total estimated project cost of $123.7 million.[6] The FY 2022 request will fund NOAA's contract for the aircraft system and essential instrumentation. Funding in FY 2023 would enable program management, testing and transition activities in out years. With these funds, NOAA will procure another Gulfstream 550 high altitude jet, providing back up capabilities as

[6] Final project costs may vary depend on market conditions and contract negotiations.

required under the Weather Act. Because Gulfstream is no longer manufacturing new G-550s, NOAA will procure a slightly used G550 through an option on a current contract. This improves efficiency in acquisition, maintenance and operations of this aircraft by standardizing the fleet. NOAA will seek an aircraft that has few flight hours and a more recent manufacturing date to ensure reliability and cost-effectiveness. Prior to acceptance the aircraft will also undergo an inspection and engine overhaul.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:

FY 2022

- Acquisition actions, culminating in Contract Award
- Identify and approve a suitable candidate aircraft
- Remove existing modifications and outfitting

FY 2023

- Inspect systems
- Install updates
- Overhaul engines as needed
- Begin airframe modifications

FY 2024

- Provide oversight of airframe modifications

FY 2025

- Receive modified aircraft
- Begin installing instrumentation
- Begin testing and calibrating systems

FY 2026

- Induct into NOAA fleet by end of first quarter

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Deliverables:

- One additional high-altitude jet Hurricane Hunter

	2022	2023	2024	2025	2026
Outyear Costs:					
Direct Obligations	100,000	0	0	0	0
Capitalized	100,000	0	0	0	0
Uncapitalized	0	0	0	0	0
Budget Authority	100,000	0	0	0	0
Outlays	63,000	27,000	10,000	0	0
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Out-year Funding Estimates ($ in Thousands):

2nd G550	**2021 & Prior**	**2022**	**2023**	**2024**	**2025**	**2026**	**CTC**	**Total**
Change from 2022 Base	N/A	100,000	0	0	0	0	N/A	100,000
Total Request	0	120,000	3,7000	0	0	0	N/A	123,700

*2022 Base reflects reversion to pre-reprogramming 2021 level of $20,000 for the Aircraft Recapitalization and Construction PPA, due to one-time nature of reprogramming. $3,700 needed in FY 2022 for this acquisition is assumed within those base funds and thus does not represent a change from the 2022 Base.

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Marine and Aviation Capital Investments
Subactivity: Aircraft Recapitalization and Construction

Object Class	2020 Enacted	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
Full-time permanent compensation	171	169	169	169	0
Other than full-time permanent	0	0	0	0	0
Other personnel compensation	3	3	3	3	0
Special personnel services payments	0	0	0	0	0
Total personnel compensation	174	172	172	172	0
Civilian personnel benefits	29	66	66	66	0
Benefits for former personnel	0	0	0	0	0
Travel and transportation of persons	31	76	76	76	0
Transportation of things	1	0	0	0	0
Rent, communications, and utilitites	0	0	0	0	0
Rental payments to GSA	0	0	0	0	0
Rental Payments to others	797	0	0	0	0
Communications, utilities and misc charges	0	0	0	0	0
Printing and reproduction	0	0	0	0	0
Advisory and assistance services	0	0	0	0	0
Other services from non-Federal sources	130	18	18	95,018	95,000
Other goods and services from Federal sources	0	0	0	0	0
Operation and maintenance of facilities	0	0	0	0	0
Research and development contracts	0	0	0	0	0
Medical care	0	0	0	0	0
Operation and maintenance of equipment	0	0	0	0	0
Subsistence and support of persons	0	0	0	0	0
Supplies and materials	609	7,508	7,508	9,508	2,000
Equipment	71,484	27,160	27,160	30,160	3,000
Lands and structures	0	0	0	0	0
Investments and loans	0	0	0	0	0
Grants, subsidies and contributions	0	0	0	0	0
Insurance claims and indemnities	0	0	0	0	0
Interest and dividends	0	0	0	0	0
Refunds	0	0	0	0	0
Total obligations	73,255	35,000	35,000	135,000	100,000

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

		2022 Base		2022 Estimate		Increase from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount
Aircraft Recapitalization and Construction	Pos./BA	4	35,000	4	50,000	0	15,000
	FTE/OBL	4	35,000	4	50,000	0	15,000

Complete G-IV replacement (+$15,000, 0 FTE/0 Positions) – NOAA requests funding to finalize instrumentation, calibration, and integration of its new high altitude jet. This funding will complete NOAA's effort to replace its current G-IV high altitude jet.

NOAA has acquired a baseline G550 aircraft and funded the required extensive modification package to replace the G-IV; final instrumentation, calibration, and integration is necessary to complete the process. NOAA's aging G-IV is trending toward 55 percent reliability by 2024. The data collected by NOAA's G-IV improves hurricane forecasting approximately 15-25 percent. Data collected by this aircraft is instrumental to the NOAA National Hurricane Center's ability to issue accurate forecasts and warnings that inform decision makers and the public about the impact of storm surge, heavy rain, wind, and tornadoes. Additional funds will enable NOAA to fully integrate the new and more reliable and capable G-550 into NOAA's fleet for the 2024 Hurricane season.

Measuring and predicting climate change impacts are core to NOAA's mission. This request will help NOAA meet the Administration's climate science goals, including EO 14008, through improved observations and forecasting for the American public.

Schedule and Milestones:
FY 2022
- Acquire instrumentation for high altitude jet

FY 2024
- G550 delivered
- Install final aircraft instruments and systems
- Test and calibrate G550

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM INCREASE FOR 2022
(Dollar amounts in thousands)

Deliverables:
FY 2024

- Fully instrumented, calibrated and integrated G550
- Reliable high altitude jet for 2024 Hurricane season

	2022	2023	2024	2025	2026
Outyear Costs:					
Direct Obligations	15,000	0	0	0	0
Capitalized	15,000	0	0	0	0
Uncapitalized	0	0	0	0	0
Budget Authority	15,000	0	0	0	0
Outlays	5,250	5,250	4,500	0	0
FTE	0	0	0	0	0
Positions	0	0	0	0	0

Out-year Funding Estimates ($ in Thousands):

GIV Replacement	**2021 & Prior**	**2022**	**2023**	**2024**	**2025**	**2026**	**CTC**	**Total**
Change from 2022 Base	N/A	15,000	0	0	0	0	N/A	15,000
Total Request	148,500	15,000	0	0	0	0	N/A	163,500

Exhibit 15

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Direct Obligations amounts in thousands)

Activity: Marine and Aviation Capital Investments
Subactivity: Aircraft Recapitalization and Construction

	Object Class	2020 Actual	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
11.1	Full-time permanent compensation	171	169	169	169	0
11.3	Other than full-time permanent	0	0	0	0	0
11.5	Other personnel compensation	3	3	3	3	0
11.8	Special personnel services payments	0	0	0	0	0
11.9	Total personnel compensation	174	172	172	172	0
12	Civilian personnel benefits	29	66	66	66	0
13	Benefits for former personnel	0	0	0	0	0
21	Travel and transportation of persons	31	76	76	151	75
22	Transportation of things	1	0	0	25	25
23	Rent, communications, and utilitites	0	0	0	0	0
23.1	Rental payments to GSA	0	0	0	0	0
23.2	Rental Payments to others	797	0	0	100	100
23.3	Communications, utilities and misc charges	0	0	0	0	0
24	Printing and reproduction	0	0	0	0	0
25.1	Advisory and assistance services	0	0	0	0	0
25.2	Other services from non-Federal sources	130	18	18	5,018	5,000
25.3	Other goods and services from Federal sources	0	0	0	0	0
25.4	Operation and maintenance of facilities	0	0	0	0	0
25.5	Research and development contracts	0	0	0	0	0
25.6	Medical care	0	0	0	0	0
25.7	Operation and maintenance of equipment	0	0	0	0	0
25.8	Subsistence and support of persons	0	0	0	0	0
26	Supplies and materials	609	7,508	7,508	11,008	3,500
31	Equipment	71,484	27,160	27,160	33,460	6,300
32	Lands and structures	0	0	0	0	0
33	Investments and loans	0	0	0	0	0
41	Grants, subsidies and contributions	0	0	0	0	0
42	Insurance claims and indemnities	0	0	0	0	0
43	Interest and dividends	0	0	0	0	0
44	Refunds	0	0	0	0	0
99	Total obligations	73,255	35,000	35,000	50,000	15,000

Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
NOAA Corps Retirement Pay (Mandatory)
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
Enacted, 2021	0	0	30,770	30,770
plus: 2022 Adjustments to Base	0	0	1,020	1,020
2022 Base	0	0	31,790	31,790
Plus: 2022 Program Changes	0	0	0	0
2022 Estimate	0	0	31,790	31,790

		2020 Actuals		2021 Enacted		2022 Base		2022 Estimate		Increase/Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
NOAA Corps Retirement Pay	POS/BA	0	30,102	0	30,770	0	31,790	0	31,790	0	0
	FTE/OBL	0	29,748	0	30,770	0	31,790	0	31,790	0	0
Total: NOAA Corps Retirement Pay	POS/BA	0	30,102	0	30,770	0	31,790	0	31,790	0	0
	FTE/OBL	0	29,748	0	30,770	0	31,790	0	31,790	0	0

Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
NOAA Corps Retirement Pay (Mandatory)
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	2020 Actuals		2021 Enacted		2022 Base		2022 Estimate		Increase/ Decrease from 2022 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	29,748	0	30,770	0	31,790	0	31,790	0	0
Total Obligations	**0**	**29,748**	**0**	30,770	**0**	**31,790**	**0**	**31,790**	**0**	**0**
Adjustments to Obligations:										
Unobligated balance	0	354	0	0	0		0		0	0
Total Budget Authority	**0**	**30,102**	**0**	**30,770**	**0**	**31,790**	**0**	**31,790**	**0**	**0**
Financing from Transfers and Other:						0		0		
	0	0	0	0	0		0		0	0
Net Appropriation	**0**	**30,102**	**0**	**30,770**	**0**	**31,790**	**0**	**31,790**	**0**	**0**

Department of Commerce
National Oceanic and Atmospheric Administration
NOAA Corps Retirement Pay (Mandatory)
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

Activity: NOAA Corps Retirement Pay (Mandatory)

Goal Statement

Provide payment of benefits to retired NOAA Commissioned Officer Corps (NOAA Corps) Officers and their families.

Base Program

In FY 2020, there were 403 retired NOAA Corps officers receiving retired pay benefits, and 31 spouses or 34 dependents of deceased retired officers, who are still eligible to receive benefits.

Statement of Operating Objectives

Schedule and Milestones:

- Transfer funds to the U.S. Coast Guard (USCG)
- Administer Healthcare funds for non-Medicare-eligible retirees, dependents, and annuitants

Deliverables:

- Benefits for retired NOAA Corps Officers and their families

Explanation and Justification

The retirement system for the uniformed services provides a measure of financial security after release from active duty for service members and their survivors. It is an important factor in the choice of a career in the uniformed services, and the legal mandate for rates to be paid is the same for all uniformed services, see 10 USC. Retired pay is an entitlement to NOAA Commissioned Corps officers under 33 USCA 3044, 33 USCA 3045, and 33 USCA 3046. Retired pay funds are transferred to the USCG, which handles the payments each year as adjusted pursuant to the National Defense Authorization Act (NDAA). Healthcare funds for non-Medicare-eligible retirees, dependents, and annuitants are administered by OMAO.

This line includes funding for the modernized retirement system, which includes matching Thrift Savings Plan (TSP) contributions, continuation pay, and retirement itself. Public Law 114-92, the NDAA for FY 2016—provides the Secretary the authority to provide

Department of Commerce
National Oceanic and Atmospheric Administration
NOAA Corps Retirement Pay (Mandatory)
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollar amounts in thousands)

TSP contributions for members of the uniformed services effective January 1, 2018. Public Law 114-92, as amended by P.L. 114-328, the NDAA for FY 2017—modifies section 356 of title 37 and the use of continuation pay for full TSP members. Members must have “completed not less than [eight] and not more than [twelve] years of service” and “[enter] into an agreement of not less than [three] additional years of obligated service.” Continuation pay applies across the board to all military members who are in the modernized retirement system and is intended to help ensure retention after a member has the ability to acquire significant retirement benefits.

Legal authority for retirement of NOAA Corps officers is contained in 33 USCA 3044. Retired officers of the NOAA Corps receive retirement benefits that are administered by USCG, in accordance with a Memorandum of Agreement between the USCG and NOAA, with funds certified by the Commissioned Personnel Center within OMAO.

Exhibit 16

Department of Commerce
National Oceanic and Atmospheric Administration
NOAA Corps Retirement Pay (Mandatory)
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	2020 Acutals	2021 Enacted	2022 Base	2022 Estimate	Increase from 2022 Base
Object Class					
13 Benefits for Former Personnel	27,248	27,570	28,590	28,590	0
25.3 Other goods and services from Federal sources	2,500	3,200	3,200	3,200	0
Total Obligations	29,748	30,770	31,790	31,790	0
Less prior year recoveries	0	0	0	0	0
Less unobligated balance, SOY	0	0	0	0	0
Plus unobligated balance, EOY	354	0	0	0	0
Offsetting collections, Mandatory	0	0	0	0	0
Less: Previously Unavail. Unoblig. Bal.	0	0	0	0	0
Total Budget Authority Mandatory	30,102	30,770	31,790	31,790	0
Personnel Data					
Full-Time Equivalent Employment					
Full-time permanent	0	0	0	0	0
Other than full-time permanent	0	0	0	0	0
Total	0	0	0	0	0
Authorized Positions:					
Full-time permanent	0	0	0	0	0
Other than full-time permanent	0	0	0	0	0
Total	0	0	0	0	0

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Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Medicare Eligible Retiree Health Fund Contribution – NOAA Corps
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
Enacted, 2021	0	0	1,591	1,591
Plus: 2022 Adjustments to Base	0	0	26	26
2022 Base	0	0	1,617	1,617
Plus: 2022 Program Changes	0	0	0	0
2022 Estimate	0	0	1,617	1,617

		2020 Actuals		2021 Enacted		2022 Base		2022 Estimate		Increase/Decrease from 2022 Base	
		Personnel	Amount	Personnel	Amoun	Personnel	Amount	Person	Amount	Person	Amount
Medicare Eligible Retiree Health Fund Contribution	Pos/BA	0	1,497	0	1,591	0	1,617	0	1,617	0	0
	FTE/OBL	0	1,497	0	1,591	0	1,617	0	1,617	0	0
Total: Medicare Eligible Retiree Health Fund Contribution	Pos/BA	0	1,497	0	1,591	0	1,617	0	1,617	0	0
	FTE/OBL	0	1,497	0	1,591	0	1,617	0	1,617	0	0

Exhibit 5

Department of Commerce
National Oceanic and Atmospheric Administration
Medicare Eligible Retiree Health Fund Contribution – NOAA Corps
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	2020 Actuals		2021 Enacted		2022 Base		2022 Estimate		Increase/ Decrease from 2022 Base	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	1,497	0	1,591	0	1,617	0	1,617	0	0
Total Obligations	**0**	**1,497**	**0**	**1,591**	**0**	**1,617**	**0**	**1,617**	**0**	**0**
Adjustments to Obligations:										
Unobligated balance	0	0	0	0	0	0	0	0	0	0
Total Budget Authority	**0**	**1,497**	**0**	**1,591**	**0**	**1,617**	**0**	**1,617**	**0**	**0**
Financing from Transfers and Other:										
Net Appropriation	**0**	**1.497**	**0**	**1.591**	**0**	**1.617**	**0**	**1.617**	**0**	**0**

Department of Commerce
National Oceanic and Atmospheric Administration
Medicare Eligible Retiree Health Fund Contribution – NOAA Corps
JUSTIFICATION OF PROGRAM AND PERFORMANCE
(Dollars amounts in thousands)

Activity: Medicare-Eligible Retiree Healthcare Fund Contribution - NOAA Corps

Goal Statement

This account is NOAA's contribution to a health care accrual fund for NOAA Commissioned Officer Corps (NOAA Corps) officers. The accrual fund pays for the future health care benefits for current officers once they retire and become Medicare-eligible, as well as for their dependents and annuitants.

Base Program

For FY 2022, payments to the accrual fund are estimated at $1,617.

Statement of Operating Objectives

Schedule and Milestones: (On-going)

- Contribute to healthcare accrual fund
- Provide healthcare benefits to eligible retired NOAA Corps Officers and their dependents and annuitants

Deliverables:

- Healthcare benefits of present, active-duty NOAA offices and their dependents and annuitants

Explanation and Justification

The FY 2003 NDAA requires all uniformed services, including NOAA, to participate in an accrual fund for Medicare-eligible retirees. Payments into this accrual fund will cover the future health care benefits of present, active-duty NOAA officers and their dependents and annuitants.

Department of Commerce
National Oceanic and Atmospheric Administration
Medicare Eligible Retiree Health Fund Contribution – NOAA Corps
SUMMARY OF RESOURCE REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	2020 Actuals	2021 Enacted	2022 Base	2022 Estimate	Increase/Decrease from 2022 Base
Object Class					
25.3 Other goods and services from Federal sources	1,497	1,591	1,617	1,617	0
Total Obligations	**1,497**	**1,591**	**1,617**	**1,617**	**0**
Less prior year recoveries	0	0	0	0	0
Less unobligated balance, SOY	0	0	0	0	0
Plus unobligated balance, EOY	0	0	0	0	0
Offsetting collections, Mandatory	0	0	0	0	0
Less: Previously Unavail. Unoblig. Bal.	0	0	0	0	0
Total Budget Authority	**1,497**	**1,591**	**1,617**	**1,617**	**0**
Personnel Data					
Full-Time Equivalent Employment					
Full-time permanent	0	0	0	0	0
Other than full-time permanent	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**
Authorized Positions:					
Full-time permanent	0	0	0	0	0
Other than full-time permanent	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**

Department of Commerce
National Oceanic and Atmospheric Administration
APPROPRIATION LANGUAGE AND CODE CITATIONS

For expenses necessary for activities authorized by law for the National Oceanic and Atmospheric Administration,

5 USC 5348	15 USC 1514	16 USC 3645	33 USC 2706	
5 USC 4703	15 USC 1517	16 USC 4101 et seq.	33 USC 2712	
7 USC 1622	15 USC 1537-40	16 USC 4701 et seq.	33 USC 2801 et seq.	
10 USC 1072	15 USC 8511-8521	16 USC 5001 et seq.	33 USC 3001 et seq.	
10 USC 1116	16 USC 6804 note	16 USC 8206	33 USC 3402	
10 USC 1409	16 USC 46a	196 USC 4732	33 USC 3501	
10 USC 2311	16 USC 661 et seq.	31 USC 1105	33 USC 3601	
10 USC 8931	16 USC 757a et seq.	31 USC 6401	33 USC 3703	
12 USC 1715m	16 USC 1361	33 USC 706 et seq.	33 USC 4001	
15 USC 313	16 USC 1431 et seq.	33 USC 883 a-i et seq.	33 USC 4213	
15 USC 313a	16 USC 1447a et seq.	33 USC 891 et seq.	42 USC 8902-05	
15 USC 313b	16 USC 1451 et seq.	33 USC 893 et seq.	42 USC 9601 et seq.	
15 USC 313 note	16 USC 1456a	33 USC 1121 et seq.	43 USC 1347e	
15 USC 325	16 USC 1456-1	33 USC 1141	43 USC 3102	
15 USC 330b	16 USC 1467	33 USC 1251 note	44 USC 1307	
15 USC 330e	16 USC 1531 et seq.	33 USC 1321	49 USC 44720	
15 USC 1511 b-e	16 USC 1801 et seq.	33 USC 1441-44	51 USC 6061	

Government Organization and Employees

5 USC 5348 - Crews of Vessels
"...the pay of officers and members of crews of vessels excepted from chapter 51 of this title by section 5102(c)(8) of this title shall be fixed and adjusted from time to time as nearly as is consistent with the public interest in accordance with prevailing rates and practices in the maritime industry."

5 USC 4703- Demonstration Projects
"…the Office of Personnel Management may, directly or through agreement or contract with one or more agencies and other public and private organizations, conduct and evaluate demonstration projects."

Department of Commerce
National Oceanic and Atmospheric Administration
APPROPRIATION LANGUAGE AND CODE CITATIONS

Agriculture

7 USC 1622 - Distribution and Marketing of Agricultural Products

"The Secretary ... is directed and authorized: ...

(a) to determine the needs and develop or assist in the development of plans for the proper assembly, processing, transportation, storage, distribution, and handling of agricultural (fish) products.

(f) to conduct and cooperate in consumer education for the more effective utilization and greater consumption of agricultural products (fish)...

(g) to collect and disseminate marketing information... for the purpose of ... bringing about a balance between production and utilization of agricultural (fish) products.

(h) to inspect, certify, and identify the class, quality, quantity and condition of agricultural (fish) products ...

(m) to conduct ... research ... to determine the most efficient ... processes for the handling, storing, preserving, protecting...of agricultural (fish) commodities ..."

(h) - Duties of Secretary relating to agricultural products; penalties

"Whoever knowingly shall falsely make, issue, alter, forge, or counterfeit any official certificate, memorandum, or other identification, with respect to inspection, class, grade, quality, size, quantity, or condition, issued or authorized under this section or knowingly cause or procure, or aid, assist in, or be a party to, such false making, issuing, altering, forging, or counterfeiting, or whoever knowingly shall possess, without promptly notifying the Secretary (of Commerce) or his representative, utter, published, or used as true, any such falsely made, altered forged, or counterfeited official certificate, memorandum, mark, identification, or device, or whoever knowingly represents that an agricultural product has been officially inspected or graded...when in fact such commodity has not been so graded or inspected shall be fined not more than $1,000 or imprisoned not more than one year, or both."

Armed Forces

10 USC 1072 Medical and Dental Care

"…The term "uniformed services" means the armed forces and the Commissioned Corps of the National Oceanic and Atmospheric Administration and of the Public Health Service."

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APPROPRIATION LANGUAGE AND CODE CITATIONS

10 USC 1116 Determinations of Contributions to the Fund

"At the beginning of each fiscal year after September 30, 2005, the Secretary of the Treasury shall promptly pay into the Fund from the General Fund of the Treasury--(1) the amount certified to the Secretary by the Secretary of Defense under subsection (c), which shall be the contribution to the Fund for that fiscal year required by section 1115; and (2) the amount determined by each administering Secretary under section 1111(c) as the contribution to the Fund on behalf of the members of the uniformed services under the jurisdiction of that Secretary."

10 USC 1409 - Retired pay multiplier

"(4) Modernized retirement system.-(A) Reduced multiplier for full tsp members .-Notwithstanding paragraphs (1), (2), and (3), in the case of a member who first becomes a member of the uniformed services on or after January 1, 2018, or a member who makes the election described in subparagraph (B) (referred to as a "full TSP member")- (i) paragraph (1)(A) shall be applied by substituting "2" for "2½"; (ii) clause (i) of paragraph (3)(B) shall be applied by substituting "60 percent" for "75 percent"; and (iii) clause (ii)(I) of such paragraph shall be applied by substituting "2" for "2½". (B) Election to participate in modernized retirement system .-Pursuant to subparagraph (C), a member of a uniformed service serving on December 31, 2017, who has served in the uniformed services for fewer than 12 years as of December 31, 2017, may elect, in exchange for the reduced multipliers described in subparagraph (A) for purposes of calculating the retired pay of the member, to receive Thrift Savings Plan contributions pursuant to section 8440e(e) of title 5. (C) Election period.- (i) In general .-Except as provided in clauses (ii) and (iii), a member of a uniformed service described in subparagraph (B) may make the election authorized by that subparagraph only during the period that begins on January 1, 2018, and ends on December 31, 2018. (ii) Hardship extension .-The Secretary concerned may extend the election period described in clause (i) for a member who experiences a hardship as determined by the Secretary concerned. (iii) Effect of break in service .-A member of a uniformed service who returns to service after a break in service that occurs during the election period specified in clause (i) shall make the election described in subparagraph (B) within 30 days after the date of the reentry into service of the member."

10 USC 2311 Assignment and Delegation of Procurement Functions and Responsibilities

(a) In General.--Except to the extent expressly prohibited by another provision of law, the head of an agency may delegate, subject to his direction, to any other officer or official of that agency, any power under this chapter.
(b) Procurements For or With Other Agencies.--Subject to subsection (a), to facilitate the procurement of property and services covered by this chapter by each agency named in section 2303 of this title for any other agency, and to facilitate joint procurement by those agencies--
    (1) the head of an agency may delegate functions and assign responsibilities relating to procurement to any officer or employee within such agency;

(2) the heads of two or more agencies may by agreement delegate procurement functions and assign procurement responsibilities from one agency to another of those agencies or to an officer or civilian employee of another of those agencies; and
(3) the heads of two or more agencies may create joint or combined offices to exercise procurement functions and responsibilities.

10 USC 8931 – National Oceanographic Partnership Program
The Secretary of the Navy shall establish a program to be known as the "National Oceanographic Partnership Program."

Banks and Banking

12 USC 1715m - Mortgage Insurance for Servicemen [NOAA Corps]
This section authorizes payment of Federal Housing Administration (FHA) home mortgage insurance premiums to NOAA Corps Officers.

Commerce and Trade

15 USC 313 - Duties of Secretary of Commerce [National Weather Service]
"The Secretary of Commerce...shall have charge of the forecasting of weather,...issue of storm warnings,...weather and flood signals,... gauging and reporting of rivers,...collection and transmission of marine intelligence...,...reporting of temperature and rainfall conditions..., the display of frost and cold-wave signals, the distribution of meteorological information..., and the taking of such meteorological observations as may be necessary to establish and record the climatic conditions of the United States, or as are essential for the proper execution of the foregoing duties."

15 USC 313a - Establishment of Meteorological Observation Stations in the Arctic Region
"... The Secretary of Commerce shall ... take such actions as may be necessary in the development of an international basic meteorological reporting network in the Arctic region of the Western Hemisphere..."

15 USC 313b - Institute for Aviation Weather Prediction
"The Administrator of the National Oceanic and Atmospheric Administration shall establish an Institute for Aviation Weather Prediction. The Institute shall provide forecasts, weather warnings, and other weather services to the United States aviation community.…"

15 USC 313d – National Integrated Drought Information System (NIDIS) Program

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"The Under Secretary, through the National Weather Service and other appropriate weather and climate programs in the National Oceanic and Atmospheric Administration, shall establish a National Integrated Drought Information System to better inform and provide for more timely decisionmaking to reduce drought related impacts and costs."

15 USC 313 note - Weather Service Modernization Act (a)
As part of the budget justification documents submitted to Congress in support of the annual budget request for the department of Commerce, the Secretary shall include a National Implementation Plan for modernization of the National Weather Service for each fiscal year following fiscal year 1993 until such modernization is complete. The Plan shall set forth the actions, during the 2-year period beginning with the fiscal year for which the budget request is made, that will be necessary to accomplish the objectives described in the Strategic Plan.

15 USC 325 - Spending Authority for the National Weather Service
"...Appropriations now or hereafter provided for the National Weather Service shall be available for: (a) furnishing food and shelter...to employees of the Government assigned to Arctic stations; (b) equipment and maintenance of meteorological offices and stations, and maintenance and operation of meteorological facilities outside the United States... (c) repairing, altering, and improving of buildings occupied by the National Weather Service, and care and preservation of grounds...(d) arranging for communication services... and
(e) purchasing tabulating cards and continuous form tabulating paper.

15 USC 330b - Duties of Secretary relating to Weather Modification Activities or Attempts - Reporting Requirement
"The Secretary shall maintain a record of weather modification activities, including attempts, which take place in the United States and shall publish summaries thereof from time to time as he determines."
(a) "All reports, documents, and other information received by the Secretary under the provisions of this chapter shall be made available to the public to the fullest practicable extent."

15 USC 330e - Authorization of Appropriations relating to Weather Modification Activities or Attempts - Reporting Requirement
This section provides funding authority to support the reporting requirements specified in this chapter.

15 USC 1511b - United States Fishery Trade Officers
"For purposes of carrying out export promotion and other fishery development responsibilities, the Secretary of Commerce…shall appoint not fewer than six officers who shall serve abroad to promote United States fishing interests. These officers shall be knowledgeable about the United States fishing industry, preferably with experience derived from the harvesting,

processing, or marketing sectors of the industry or from the administration of fisheries programs. Such officers, who shall be employees of the Department of Commerce, shall have the designation of fishery trade officers."

15 USC 1511c - NOAA Estuarine Programs Office
"... The Estuarine Programs Office shall develop, coordinate, and implement the estuarine activities of the administration with the activities of other Federal and State agencies. There are authorized to be appropriated to the Administration not to exceed $560,000 for fiscal year 1989, and $600,000 for fiscal year 1990."

15 USC 1511d - Chesapeake Bay Office
The Secretary of Commerce shall establish, within the National Oceanic and Atmospheric Administration, an office to be known as the Chesapeake Bay Office…which shall provide technical assistance on processes impacting the Chesapeake Bay system, its restoration and habitat protection; develop a strategy to meet the commitments of the Chesapeake Bay Agreement; and coordinate programs and activities impacting the Chesapeake Bay, including research and grants.

15 USC 1511e - Office of Space Commercialization
"There is established with the Department of Commerce an Office of Space Commercialization" which shall "promote commercial provider investment in space activities…assist United States commercial providers in [their efforts to] conduct business with the United States Government, [act] as an industry advocate within the executive branch…, ensure that the United States Government does not compete with United States commercial providers…, [promote] the export of space-related goods and services, [represent] the Department of Commerce in the development of United States policies…and [seek] the removal of legal, policy, and institutional impediments to space commerce."

15 USC 1514 - Basic Authority for Performance of Certain Functions and Activities of Department
"Appropriations are authorized for the following activities of the Department of Commerce:

(a) furnishing to employees...and their dependents, in Alaska and other points outside the continental United States, free emergency medical services...and supplies;
(b) purchasing, transporting, storing, and distributing food and other subsistence supplies for resale to employees...and their dependents, in Alaska and other points outside the continental United States at a reasonable value...; the proceeds from such resales to be credited to the appropriation from which the expenditure was made;
(c) ...establishment, maintenance, and operation of messing facilities, by contract or otherwise, in Alaska and other points outside the continental United States..., such service to be furnished to employees...and their dependents,...
(d) reimbursement...of officers or employees in or under the Department...for food, clothing, medicines, and other supplies furnished by them in emergencies for the temporary relief of dislocated persons in remote localities;

(e) providing motion-picture equipment and film for recreation of crews of vessels..., for recreation for employees in remote localities..., and for training purposes;
(f) erecting, altering, repairing, equipping, furnishing, and maintaining...such living and working quarters and facilities as may be necessary to carry out its authorized work at remote localities not on foreign soil where such living and working accommodations are not otherwise available."

15 USC 1517 - Transfer of Statistical or Scientific Work
"The President is authorized, by order in writing, to transfer at any time the whole or any part of any office, bureau, division, or other branch of the public service engaged in statistical or scientific work, from the Department of State, the Department of the Treasury, the Department of Defense, the Department of Justice, the United States Postal Service, or the Department of the Interior, to the Department of Commerce; and in every such case the duties and authority performed by and conferred by law upon such office, bureau, division, or other branch of the public service, or the part thereof so transferred, shall be thereby transferred with such office, bureau, division, or other branch of the public service, or the part thereof which is so transferred. All power and authority conferred by law, both supervisory and appellate, upon the department from which such transfer is made, or the Secretary thereof, in relation to the said office, bureau, division, or other branch of the public service, or the part thereof so transferred, shall immediately, when such transfer is so ordered by the President, be fully conferred upon and vested in the Department of Commerce, or the Secretary thereof, as the case may be, as to the whole or part of such office, bureau, division, or other branch of the public service so transferred."

15 USC 1537 Needs Assessment for Data Management
"Not later than 12 months after October 29, 1992, and at least biennially thereafter, the Secretary of Commerce shall complete an assessment of the adequacy of the environmental data and information systems of NOAA."

15 USC 1538 – Notice of reprogramming
(a) In general
The Secretary of Commerce shall provide notice to the Committee on Commerce, Science, and Transportation and Committee on Appropriations of the Senate and to the Committee on Merchant Marine and Fisheries, Committee on Science, Space, and Technology, and Committee on Appropriations of the House of Representatives, not less than 15 days before reprogramming funds available for a program, project, or activity of the National Oceanic and Atmospheric Administration in an amount greater than the lesser of $250,000 or 5 percent of the total funding of such program, project, or activity if the reprogramming-
(1) augments an existing program, project, or activity;
(2) reduces by 5 percent or more (A) the funding for an existing program, project, or activity or (B) the numbers of personnel therefor as approved by Congress; or

(3) results from any general savings from a reduction in personnel which would result in a change in an existing program, project, or activity.

(b) Notice of reorganization
The Secretary of Commerce shall provide notice to the Committees on Merchant Marine and Fisheries, Science, Space, and Technology, and Appropriations of the House of Representatives, and the Committees on Commerce, Science, and Transportation and Appropriations of the Senate not later than 15 days before any major reorganization of any program, project, or activity of the National Oceanic and Atmospheric Administration.

15 USC 1539 – Financial Assistance
(a) Processing of applications
Within 12 months after October 29, 1992, the Secretary of Commerce shall develop and, after notice and opportunity for public comment, promulgate regulations or guidelines to ensure that a completed application for a grant, contract, or other financial assistance under a nondiscretionary assistance program shall be processed and approved or disapproved within 75 days after submission of the application to the responsible program office of the National Oceanic and Atmospheric Administration.
(b) Notification of applicant
Not later than 14 days after the date on which the Secretary of Commerce receives an application for a contract, grant, or other financial assistance provided under a nondiscretionary assistance program administered by the National Oceanic and Atmospheric Administration, the Secretary shall indicate in writing to the applicant whether or not the application is complete and, if not complete, shall specify the additional material that the applicant must provide to complete the application.
(c) Exemption
In the case of a program for which the recipient of a grant, contract, or other financial assistance is specified by statute to be, or has customarily been, a State or an interstate fishery commission, such financial assistance may be provided by the Secretary to that recipient on a sole-source basis, notwithstanding any other provision of law.
(d) "Nondiscretionary assistance program" defined
In this section, the term "nondiscretionary assistance program" means any program for providing financial assistance—
(1) under which the amount of funding for, and the intended recipient of, the financial assistance is specified by Congress; or
(2) the recipients of which have customarily been a State or an interstate fishery commission.

<u>15 USC 1540 – Cooperative Agreements</u>
"The Secretary of Commerce, acting through the Under Secretary of Commerce for Oceans and Atmosphere, may enter into cooperative agreements and other financial agreements with any nonprofit organization to (1) aid and promote scientific and educational activities to foster public understanding of the National Oceanic and Atmospheric Administration or its programs; and (2) solicit private donations for the support of such activities."

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15 USC 8511-8521 – United States Weather Research and Forecasting Improvement
In conducting research, the Under Secretary shall prioritize improving weather data, modeling, computing, forecasting, and warnings for the protection of life and property and for the enhancement of the national economy.

Conservation

16 USC 6804 note – John D. Dingell Jr. Conservation, Management, and Recreation Act
(b)EVERY KID OUTDOORS PROGRAM.—
"(1)ESTABLISHMENT.—The Secretaries shall jointly establish a program, to be known as the 'Every Kid Outdoors program', to provide free access to Federal land and waters for students and accompanying individuals in accordance with this subsection.

16 USC 46a - Marine Fisheries Program Authorization Act
This Act authorizes NMFS fisheries programs not otherwise authorized by law, including research to reduce entanglement of marine mammals in fishing gear, development of habitat restoration techniques, restoration of Chesapeake Bay, and conservation of Antarctic living marine resources.

16 USC 661 et seq.- Declaration of Purpose; Cooperation of Agencies; Surveys and Investigations; Donations
"...the Secretary of the Interior is authorized (1) to provide assistance to, and cooperate with, Federal, State, and public or private agencies and organizations in the development, protection, rearing, and stocking of all species of wildlife, resources thereof, and their habitat, in controlling losses of the same from disease or other causes, in minimizing damages from overabundant species, in providing public shooting and fishing areas, including easements across public lands for access thereto, and in carrying out other measures necessary to effectuate the purposes of said sections; (2) to make surveys and investigations of the wildlife of the public domain, including lands and waters or interests therein acquired or controlled by any agency of the United States; and (3) to accept donations of land and contributions of funds in furtherance of the purposes of said sections."

16 USC 757a et seq.- Anadromous, Great Lakes, and Lake Champlain Fisheries
The Act authorizes cooperative agreements with States "that are concerned with the development, conservation, and enhancement of [anadromous] fish" (section 757a(a)).

16 USC 1361 - Congressional Findings

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"The Congress finds that - (1) certain species and population stocks of marine mammals are, or may be, in danger of extinction or depletion as a result of man's activities;"

"The Secretary is authorized to make grants, or to provide financial assistance in such other form as he deems appropriate, to any Federal or State agency, public or private institution, or other person for the purpose of assisting such agency, institution, or person to undertake research in subjects which are relevant to the protection and conservation of marine mammals, and shall provide financial assistance for, research into new methods of locating and catching yellow-fin tuna without the incidental taking of marine mammals."

16 USC 1431 et seq. - Findings, Purposes, and Policies [The National Marine Sanctuaries Act, as amended]
(b) Purposes and Policies

"The purposes and policies of this title are -

(1) to identify and designate as national marine sanctuaries areas of the marine environment which are of special national significance;
(2) to provide authority for ... conservation and management of these marine areas ...
(3) to support, promote, and coordinate scientific research on, and monitoring of, the resources of these marine areas...
(4) to enhance public awareness, understanding, appreciation, and wise use of the marine environment;
(5) to facilitate to the extent compatible with the primary objective of resource protection, all public and private uses of the resources of these marine areas not prohibited pursuant to other authorities;
(6) to develop and implement coordinated plans for the protection and management of these areas...;
(7) to create models of, and incentives for, ways to conserve and manage these areas..."
(8) to cooperate with global programs ...; and
(9) to maintain, restore, and enhance living resources ..."

16 USC 1447a et seq. - Regional Marine Research Programs
Authorizes NOAA/EPA and Governors of certain states to appoint members to a number of regional marine research boards. Each board is to develop a comprehensive four year marine research plan and "the Administrator of the National Oceanic and Atmospheric Administration shall administer a grant program to support the administrative functions of each Board."

Authorization for the Boards expires on October 1, 1999. The authorization for appropriations expired at the end of fiscal year 1996.

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16 USC 1451 et seq. - Findings, Purposes, and Policies [Coastal Zone Management Act]
Establishes a voluntary partnership between the Federal Government and coastal States. It also establishes the National Estuarine Reserve Research program, in which the Secretary of Commerce may designate an estuarine area as a national estuarine research reserve in consultation with governor of affected state.

16 USC 1456a – Coastal Zone Management Fund
"(b) (1) The Secretary shall establish and maintain a fund, to be known as the 'Coastal Zone Management Fund', which shall consist of amounts retained and deposited into the Fund under subsection (a) of this section and fees deposited into the Fund under section 1456 (i) (3) of this title"

16 USC 1456-1 – Coastal and Estuarine Land Conservation Program
Amends the Coastal Zone Management Act of 1972 to authorize the Secretary of Commerce to conduct a Coastal and Estuarine Land Conservation Program to protect important coastal and estuarine areas. Requires related property acquisition grants to coastal states with approved coastal zone management plans or National Estuarine Research Reserve units. Authorizes appropriations.

16 USC 1467 – Establishment of the Digital Coast
(a)ESTABLISHMENT
(1)IN GENERAL
The Secretary shall establish a program for the provision of an enabling platform that integrates geospatial data, decision-support tools, training, and best practices to address coastal management issues and needs. Under the program, the Secretary shall strive to enhance resilient communities, ecosystem values, and coastal economic growth and development by helping communities address their issues, needs, and challenges through cost-effective and participatory solutions.

16 USC 1531 et seq. – Congressional Findings and Declaration of Purposes and Policy
The purposes of the Act are "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in [the statute]" (section 1531(b)).

16 USC 1801 et seq. - Magnuson-Stevens Fishery Conservation and Management Act
The primary purpose of the Act is "to take immediate action to conserve and manage the fishery resources found off the coasts of the United States (section 1801(b)(1))."

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16 USC 3645 - Pacific Coastal Salmon Recovery
"(A) For salmon habitat restoration, salmon stock enhancement, and salmon research, including the construction of salmon research and related facilities, there is authorized to be appropriated for each of fiscal years 2000, 2001, 2002, and 2003, $90,000,000 to the States of Alaska, Washington, Oregon, and California. Amounts appropriated pursuant to this subparagraph shall be made available as direct payments. The State of Alaska may allocate a portion of any funds it receives under this subsection to eligible activities outside Alaska."

Amended in PL109-479 Section 302(d) as follows: Section 16(d)(2)(A) of the Pacific Salmon Treaty, as transferred by paragraph (1), is amended—

(1) by inserting "sustainable salmon fisheries," after "enhancement,";
(2) by inserting "2005, 2006, 2007, 2008, and 2009," after "2003"; and
(3) by inserting ''Idaho,'' after ''Oregon,''.

16 USC 4101 et seq. – Interjurisdictional Fisheries
"The purposes of this chapter are - (1) to promote and encourage State activities in support of the management of interjurisdictional fishery resources, and (2) to promote and encourage management of interjurisdictional fishery resources through their range" (3) to promote and encourage research in preparation for the implementation of the use of ecosystems and interspecies approaches to the conservation and management of interjurisdictional fishery resources throughout their range."

16 USC 4701 et seq. - Aquatic Nuisance Prevention and Control
Establishes an interagency Aquatic Nuisance Species Task Force, of which the Administrator of NOAA is a co-chair. The task force's responsibilities include developing and implementing "a program for waters of the United States to prevent introduction and dispersal of aquatic nuisance species; to monitor, control and study such species; and to disseminate related information."

16 USC 5001 et seq. - Purpose of Convention
"It is the purpose ... to implement the Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean, signed in Moscow, February 11, 1992."

16 USC 8206 – America's Conservation Enhancement Act

(a) In general

The Director, the National Oceanic and Atmospheric Administration Assistant Administrator, the Environmental Protection Agency Assistant Administrator, and the Director of the United States Geological Survey, in coordination with the Forest Service

and other appropriate Federal departments and agencies, may provide scientific and technical assistance to Partnerships, participants in fish habitat conservation projects, and the Board.

Customs Duties

19 USC 4732 – United States-Mexico-Canada Agreement Implementation
(a) IN GENERAL.—Upon the request of the Trade Representative, the Administrator of the Environmental Protection Agency, the Director of the U.S. Fish and Wildlife Service, and the Administrator of the National Oceanic Atmospheric Administration may detail, on a reimbursable basis, one employee of each such respective agency to the Office of the United States Trade Representative to be assigned to the United States Embassy in Mexico to carry out the duties described in subsection (b).

Money and Finance

31 USC 1105 - Budget Contents and Submission to Congress
(a) On or after the first Monday in January but not later than the first Monday in February of each year, the President shall submit a budget of the United States Government for the following fiscal year. Each budget shall include a budget message and summary and supporting information.

Amended in PL108-447 (FY 2005 Omnibus Appropriations Act) as follows: "*Provided further,* That beginning in fiscal year 2006 and for each fiscal year thereafter, the Secretary of Commerce shall include in the budget justification materials that the Secretary submits to Congress in support of the Department of Commerce budget (as submitted with the budget of the President under section 1105(a) of title 31, 10 United States Code) an estimate for each National Oceanic and Atmospheric Administration procurement, acquisition and construction program having a total multiyear program cost of more than $5,000,000 and simultaneously the budget justification materials shall include an estimate of the budgetary requirements for each such program for each of the 5 subsequent fiscal years."

31 USC 6401 - Grant Reporting - Efficiency and Agreements Transparency Act of 2019
To modernize Federal grant reporting and other purposes.

Department of Commerce
National Oceanic and Atmospheric Administration
APPROPRIATION LANGUAGE AND CODE CITATIONS

Navigation and Navigable Waters

33 USC 706 et seq. - Department of Commerce; Current Precipitation Information; Appropriation
"There is authorized an expenditure as required,..., for the establishment, operation, and maintenance by the Secretary of Commerce of a network of recording and non-recording precipitation stations, known as the Hydroclimatic Network, whenever...such service is advisable..."

33 USC 883a et seq. - Surveys and Other Activities
"...the Secretary...is authorized to conduct the following activities:

(1) Hydrographic and topographic surveys;
(2) Tide and current observations;
(3) Geodetic-control surveys;
(4) Field surveys for aeronautical charts;
(5) Geomagnetic, seismological, gravity, and related geophysical measurements and investigations, and observations ..."

33 USC 883b - Dissemination of Data; Further Activities
"...the Secretary is authorized to conduct the following activities:

(1) Analysis and prediction of tide and current data;
(2) Processing and publication of data...;
(3) Compilation and printing of nautical charts...;
(4) Distribution of nautical charts..."

33 USC 883c - Geomagnetic Data; Collection; Correlation, and Dissemination
"To provide for the orderly collection of geomagnetic data...the Secretary ... is authorized to collect, correlate, and disseminate such data."

33 USC 883d - Improvement of Methods, Instruments, and Equipments; Investigations and Research
"...the Secretary ... is authorized to conduct developmental work for the improvement of surveying and cartographic methods, instruments, and equipments; and to conduct investigations and research in geophysical sciences..."

Department of Commerce
National Oceanic and Atmospheric Administration
APPROPRIATION LANGUAGE AND CODE CITATIONS

33 USC 883e - Cooperative Agreements for Surveys and Investigations; Contribution of Costs Incurred by National Oceanic and Atmospheric Administration
"(1) The Secretary of Commerce is authorized to enter into cooperative agreements with, and to receive and expand funds made available by... for surveys or investigations... or for performing related surveying and mapping activities... and for the preparation and publication of the results thereof."

"(2) The Secretary of Commerce is authorized to establish the terms of any cooperative agreement entered into ... including the amount of funds to be received ... which the Secretary determines represents the amount of benefits derived ... from the cooperative agreement."

33 USC 883f - Contracts with Qualified Organizations
"The Secretary is authorized to contract with qualified organizations for the performance of any part of the authorized functions of the National Ocean Survey..."

33 USC 883h - Employment of Public Vessels
"The President is authorized to cause to be employed such of the public vessels as he deems it expedient to employ, and to give such instructions for regulating their conduct as he deems proper in order to carry out the provisions of this subchapter."

33 USC 883i - Authorization of Appropriations
"There are hereby authorized to be appropriated such funds as may be necessary to acquire, construct, maintain, and operate ships, stations, equipment, and facilities and for such other expenditures, including personal services at the seat of government and elsewhere and including the erection of temporary observatory buildings and lease of sites therefore as may be necessary..."

33 USC 891 et seq. - Fleet Replacement and Modernization Program
"The Secretary is authorized to implement... a 15-year program to replace and modernize the NOAA fleet."

33 USC 893 et seq. - Research, Development, and Education
"The Administrator….shall establish a coordinated program of ocean, coastal, Great Lakes, and atmospheric research and development….that shall focus on the development of advanced technologies and analytical methods that will promote United States leadership in ocean and atmospheric science and competitiveness in the applied uses of such knowledge."

33 USC 1121 et seq - National Sea Grant College Program Amendments Act of 2020
(a)FINDINGS - The Congress finds and declares the following:

(1)The national interest requires a strategy to—
(A) provide for the understanding and wise use of ocean, coastal, and Great Lakes resources and the environment;
(B) foster economic competitiveness;
(C) promote public stewardship and wise economic development of the coastal ocean and its margins, the Great Lakes, and the exclusive economic zone;
(D) encourage the development of preparation, forecast, analysis, mitigation, response, and recovery systems for coastal hazards;
(E) understand global environmental processes and their impacts on ocean, coastal, and Great Lakes resources; and
(F) promote domestic and international cooperative solutions to ocean, coastal, and Great Lakes issues.

33 USC 1141 Young Fisherman's Development Act
To preserve United States fishing heritage through a national program dedicated to training and assisting the next generation of commercial fishermen.

33 USC 1251 note - Water Pollution Prevention and Control
Through the National Shellfish Indicator Program, authorizes the Secretary of Commerce, in cooperation with the Secretary of Health and Human Services and the Administrator of EPA, to establish and administer a 5-year national shellfish research program for the purpose of improving existing classification systems for shellfish growing waters using the latest technological advancements in microbiology and epidemiological methods.

33 USC 1321 **-** Oil and Hazardous Substances [Clean Water Act]
Authorizes the recovery of damages to natural resources in the event of an oil spill in waters of the United States. This authority has been delegated to several Federal agencies, including the Department, pursuant to an Executive Order.

33 USC 1441 **-** Monitoring and Research Program [Marine Protection, Research and Sanctuaries Act]
Authorizes the Secretary of Commerce, in coordination with other agencies, to initiate a comprehensive and continuing program of monitoring and research regarding the effects of the dumping of material into ocean waters or other coastal waters where the tide ebbs and flows or into the Great Lakes or their connecting waters.

33 USC 1442 - Research Program Respecting Possible Long-range Effects of Pollution, Overfishing, and Man-induced Changes of Ocean Ecosystems
Authorizes the Secretary of Commerce, in consultation with other agencies, to … "initiate a comprehensive and continuing program of research with respect to the possible long-range effects of pollution, overfishing, and man-induced changes of ocean ecosystems."

Department of Commerce
National Oceanic and Atmospheric Administration
APPROPRIATION LANGUAGE AND CODE CITATIONS

33 USC 1443 - Regional Management Plans for Waste Disposal in Coastal Areas
Authorizes the Secretary of Commerce to assist the Environmental Protection Agency in assessing "the feasibility in coastal areas of regional management plans for the disposal of waste materials."

33 USC 1444 - Annual Report
Requires the Secretary of Commerce to provide Congress with an annual report on the Department's activities to monitor ocean dumping and research the long-range effects of pollution on ocean ecosystems.

33 USC 2706 - Natural Resources [NOAA Oil and Hazardous Substance Spill Cost Reimbursement]
"...the National Oceanic and Atmospheric Administration acts as trustee of said marine environment and/or resources, shall be deposited in the Damage Assessment and Restoration Revolving Fund ... for purposes of obligation and expenditure in fiscal year 1991 and thereafter, sums available in the Damage Assessment and Restoration Revolving Fund may be transferred, upon the approval of the Secretary ..., to the Operations, Research, and Facilities appropriation of the National Oceanic and Atmospheric Administration."

33 USC 2712 – Use of Oil Spill Liability Trust Fund
Amends Section 1012(a)(5) of the Oil Spill Liability Trust Fund Act by: "(2) by inserting after subparagraph (A) the following:''(B) not more than $15,000,000 in each fiscal year shall be available to the Under Secretary of Commerce for Oceans and Atmosphere for expenses incurred by, and activities related to, response and damage assessment capabilities of the National Oceanic and Atmospheric Administration.''

33 USC 2801 et seq. - National Coastal Monitoring Act
"The purposes of this chapter are to -

(1) establish a comprehensive national program for consistent monitoring of the Nation's coastal ecosystems;
(2) establish long-term water quality assessment and monitoring programs for high priority coastal waters that will enhance the ability of Federal, State, and local authorities to develop and implement effective remedial programs for those waters;
(3) establish a system for reviewing and evaluating the scientific, analytical, and technological means that are available for monitoring the environmental quality of coastal ecosystems;
(4) establish methods for identifying uniform indicators of coastal ecosystem quality;
(5) provide for periodic, comprehensive reports to Congress concerning the quality of the Nation's coastal ecosystems;
(6) establish a coastal environment information program to distribute coastal monitoring information;

(7) provide state programs authorized under the Coastal Zone Management Act of 1972 (16 U.S.C. 1451 et seq.) with information necessary to design land use plans and coastal zone regulations that will contribute to the protection of coastal ecosystems; and
(8) provide certain water pollution control programs authorized under the Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.) with information necessary to design and implement effective coastal water pollution controls."

33 USC 3001 et seq.- NOAA Corps Officers
There shall be in the National Oceanic and Atmospheric Administration a commissioned officer corps.

33 USC 3402 – Coordinated National Ocean Exploration Program
The Administrator of the National Oceanic and Atmospheric Administration shall, in consultation with the National Science Foundation and other appropriate Federal agencies, establish a coordinated national ocean exploration program within the National Oceanic and Atmospheric Administration that promotes collaboration with other Federal ocean and undersea research and exploration programs. To the extent appropriate, the Administrator shall seek to facilitate coordination of data and information management systems, outreach and education programs to improve public understanding of ocean and coastal resources, and development and transfer of technologies to facilitate ocean and undersea research and exploration.

33 USC 3501 – Ocean and Coastal Mapping Integration
Directs the President to establish a coordinated federal program to develop an ocean and coastal mapping plan for the Great Lakes and coastal state waters, the territorial sea, the exclusive economic zone, and the continental shelf of the United States that enhances ecosystem approaches in decision-making for conservation and management of marine resources and habitats, establishes research and mapping priorities, supports the siting of research and other platforms, and advances ocean and coastal science. Requires a plan for an integrated ocean and coastal mapping initiative within NOAA. Authorizes appropriations.

33 USC 3601 – Reauthorization of Integrated Coastal and Ocean Observation System Act
The purposes of this chapter are to—
(1) establish a national integrated System of ocean, coastal, and Great Lakes observing systems, comprised of Federal and non-Federal components coordinated at the national level by the National Ocean Research Leadership Council and at the regional level by a network of regional information coordination entities, and that includes in situ, remote, and other coastal and ocean observation, technologies, and data management and communication systems, and is designed to address regional and national needs for ocean information, to gather specific data on key coastal, ocean, and Great Lakes variables, and to ensure timely and sustained dissemination and availability of these data to—

(A) support national defense, marine commerce, navigation safety, weather, climate, and marine forecasting, energy siting and production, economic development, ecosystem-based marine, coastal, and Great Lakes resource management, public safety, and public outreach training and education;
(B) promote greater public awareness and stewardship of the Nation's ocean, coastal, and Great Lakes resources and the general public welfare; and
(C) enable advances in scientific understanding to support the sustainable use, conservation, management, and understanding of healthy ocean, coastal, and Great Lakes resources;
(2) improve the Nation's capability to measure, track, explain, and predict events related directly and indirectly to weather and climate change, natural climate variability, and interactions between the oceanic and atmospheric environments, including the Great Lakes; and
(3) authorize activities to promote basic and applied research to develop, test, and deploy innovations and improvements in coastal and ocean observation technologies, modeling systems, and other scientific and technological capabilities to improve our conceptual understanding of weather and climate, ocean-atmosphere dynamics, global climate change, physical, chemical, and biological dynamics of the ocean, coastal and Great Lakes environments, and to conserve healthy and restore degraded coastal ecosystems.

33 USC 3703 – Federal Ocean Acidification Research and Monitoring
the Joint Subcommittee on Ocean Science and Technology of the National Science and Technology Council to: (1) coordinate federal activities on ocean acidification and establish an interagency working group; and (2) develop a strategic plan for federal research and monitoring on ocean acidification. Requires specified ocean acidification programs in NOAA, the National Science Foundation (NSF), and the National Aeronautics and Space Administration (NASA). Authorizes appropriations.

33 USC 4001 - Harmful Algal Bloom and Hypoxia Research and Control Amendments Act of 2017
The President, through the Committee on Environment and Natural Resources of the National Science and Technology Council, shall establish an Inter-Agency Task Force on Harmful Algal Blooms and Hypoxia. The Task Force shall consist of a representative from—the Department of Commerce (who shall serve as Chairman of the Task Force) among others.

33 USC 4213 – Rights and Obligations of the Foundation
(f) Consultation with NOAA – The Foundation shall consult with the Under Secretary during the planning of any restoration or remediation action using funds resulting from judgments or settlements relating to the damage to trust resources of the National Oceanic and Atmospheric Administration.

Department of Commerce
National Oceanic and Atmospheric Administration
APPROPRIATION LANGUAGE AND CODE CITATIONS

The Public Health and Welfare

42 USC 8902-8905 - Acid Precipitation Program
Authorized the Administrator of NOAA to serve as co-chair of a task force to prepare a comprehensive research plan for a program to study the causes and effects of acid precipitation. Also authorizes the Administrator of NOAA to serve as the director of a related research program.

42 USC 9601 et seq. (CERCLA)
Through associated regulations and delegations, authorizes the Administrator to provide technical assistance to the Administrator, EPA, for hazardous waste response under CERCLA and the National Contingency Plan and authorizes the Administrator to act as a natural resource trustee with authority to bring a cause of action for damages resulting from an injury to, destruction of or loss of resources under NOAA's jurisdiction.

Public Lands

43 USC 1347e - Safety and Health Regulations
Authorizes the Secretary of Commerce in cooperation with other Federal entities, to conduct studies of underwater diving techniques and equipment "suitable for protection of human safety and improvement of diver performance…."

43 USC 3102 – National Landslide Preparedness Act
(a) ESTABLISHMENT.—The Secretary shall establish a program, to be known as the ''National Landslide Hazards Reduction Program'' (referred to in this section as the ''program'')— (1) to identify and understand landslide hazards and risks; (2) to reduce losses from landslides; (3) to protect communities at risk of landslide hazards; and (4) to help improve communication and emergency preparedness, including by coordinating with communities and entities responsible for infrastructure that are at risk of landslide hazards.
(3) there is authorized to be appropriated to the National Oceanic and Atmospheric Administration, $1,000,000 to carry out this section.

Department of Commerce
National Oceanic and Atmospheric Administration
APPROPRIATION LANGUAGE AND CODE CITATIONS

Public Printing and Documents

44 USC 1307 - Sale and Distribution of NOAA Nautical and Aeronautical Products
"All nautical and aeronautical products created or published ... shall be sold at ... prices ... the Secretary of Commerce shall establish annually ... so as to recover all costs attributable to data base management, compilation, printing, and distribution of such products."

Transportation

49 USC 44720 - Meteorological services
The Administrator of the Federal Aviation Administration shall make recommendations to the Secretary of Commerce on providing meteorological services necessary for the safe and efficient movement of aircraft in air commerce. In providing the services, the Secretary shall cooperate with the Administrator and give complete consideration to those recommendations.

"To promote safety and efficiency in air navigation to the highest possible degree, the Secretary shall -(1)observe, measure, investigate, and study atmospheric phenomena, and maintain meteorological stations and offices...(2) provide reports to the Administrator (3)cooperate with persons engaged in air commerce in meteorological services...(4)maintain and coordinate international exchanges of meteorological information... (5) participate in developing an international basic meteorological reporting network...(6)coordinate meteorological requirements in the United States to maintain standard observations...;(7)promote and develop meteorological science.

National and Commercial Space Programs

51 USC 60601 – Promoting Research and Observations of Space Weather to Improve the Forecasting of Tomorrow Act
(a)FINDINGS.—
(1) SPACE WEATHER.—Congress makes the following findings with respect to space weather:
(A) Space weather phenomena pose a significant threat to ground-based and space-based critical infrastructure, modern technological systems, and humans working in space.
(B) The effects of severe space weather on the electric power grid, satellites and satellite communications and information, aviation operations, astronauts living and working in space, and space-based position, navigation, and timing systems could have significant societal, economic, national security, and health impacts.
(C) Space-based and ground-based observations provide crucial data necessary to understand, forecast, and prepare for space weather phenomena.

(D) Clear roles and accountability of Federal departments and agencies are critical for efficient and effective response to threats posed by space weather.
(E) Space weather observation and forecasting are essential for the success of human and robotic space exploration.
(F) In October 2015, the National Science and Technology Council published a National Space Weather Strategy and a National Space Weather Action Plan seeking to integrate national space weather efforts and add new capabilities to meet increasing demand for space weather information.
(G) In March 2019, the National Science and Technology Council published an updated National Space Weather Strategy and Action Plan to enhance the preparedness and resilience of the United States to space weather.
(2)ROLE OF FEDERAL AGENCIES.—Congress makes the following findings with respect to the role of Federal agencies on space weather:
(A) The National Oceanic and Atmospheric Administration provides operational space weather monitoring, forecasting, and long-term data archiving and access for civil applications, maintains ground-based and space-based assets to provide observations needed for space weather forecasting, prediction, and warnings, provides research to support operational responsibilities, and develops requirements for space weather forecasting technologies and science.

Department of Commerce
National Oceanic and Atmospheric Administration
ADVISORY AND ASSISTANCE SERVICES
(Dollar Amounts in Thousands)

	2020 Actual	2021 Enacted	2022 Estimate
Management and Professional Support Services	$160,650	$163,021	$238,208
Studies, Analysis and Evaluations	$58,419	$59,281	$86,621
Engineering and Technical Services	$267,752	$271,703	$397,013
Total	$486,821	$494,005	$721,842

Consulting Services are those services of a pure nature relating to the governmental functions of agency administration and management and agency problem management. These services are normally provided by persons or organizations generally considered to have knowledge and special abilities that are not usually available within the agency. Such services can be obtained through personnel appointments, procurement contracts, or advisory committees.

Management and professional services deal with management data collection, policy review or development, program development, review or evaluation, systems engineering and other management support services. Special studies and analyses deal with the highly specialized areas of agency activity, e.g., air quality, chemical, environmental, geophysical, oceanographic, technological, and etc. Management and support services for research and development are procurement actions that meet the description of management and professional services or special studies and analyses but are funded under research and development.

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Department of Commerce
National Oceanic and Atmospheric Administration
PERIODICAL, PAMPHLETS, AND AUDIOVISUAL PRODUCTS
(Dollar Amounts in Thousands)

	2020 Actual	2021 Enacted	2022 Estimate
Periodicals	$2,028	$2,031	$2,509
Pamphlets	$1,460	$1,464	$1,807
Audiovisuals	$693	$694	$857
Total	$4,181	$4,189	$5,173

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Department of Commerce
National Oceanic and Atmospheric Administration
AVERAGE GRADE AND SALARY

	2020 Actual	2021 Enacted	2022 Estimate
Average executive and SES level pay plans	$150,951	$150,424	$154,485
Average GS/GM grade	13	13	13
Average GS/GM salary	$133,778	$135,293	$138,946
Average Pay Band salary	$97,527	$98,514	$101,174
Average Commissioned Officers salary	$78,006	$80,112	$82,275
Average salary for other positions (FWS/Wage Marine)	$68,627	$68,925	$70,786

Average salaries provided here reflect Federal Civilian and Military pay raises for 2020, 2021 and 2022, respectively.

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Department of Commerce
National Oceanic and Atmospheric Administration
IMPLEMENTATION STATUS OF GAO AND OIG RECOMMENDATIONS

31 U.S.C. 720, as amended January 3, 2019, requires the head of a federal agency to submit a written statement of the actions taken or planned on Government Accountability Office (GAO) recommendations to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 180 calendar days after the date of the report.

The Good Accounting Obligation in Government Act (GAO-IG Act), passed on January 3, 2019, (P.L. 115-414) requires each agency to include, in its annual budget justification, a report that identifies each public recommendation issued by GAO and the agency's oThat'ffice of the inspector general (OIG) which has remained unimplemented for one year or more from the annual budget justification submission date. In addition, the Act requires a reconciliation between the agency records and the IGs' Semiannual Report to Congress (SAR).

Section 1. Recommendations for which action plans were finalized since the last appropriations request.

Include information on recommendations for which an action plan has been completed since the last budget report. If you have nothing to report, state Nothing to Report."

Report Number	
Report Title	
Issue Date	
Recommendation Number	
Recommendation	
Action(s) Planned	
Action Status (Planned, In-Progress, or Complete)	
Target Completion Date	
Recommendation Status (Planned, In-Progress, or Complete)	

Alternative form if more than one report:

Report Number	**Report Title**	**Issue Date**	**Rec. Number**	**Recommendation**	**Action(s) Planned**	**Action Status (Planned, In-Progress, or Complete)**	**Target Completion Date**	**Recommendation Status (Planned, In-Progress, or Complete)**

Department of Commerce
National Oceanic and Atmospheric Administration
IMPLEMENTATION STATUS OF GAO AND OIG RECOMMENDATIONS

OIG-21-001-A[1]	The Department Has Made Progress Meeting Its Responsibilities Under the Geospatial Data Act But Must Improve Controls to Ensure Full Compliance	10/1/20	1	That the Deputy Secretary of Commerce and the Senior Agency Official for Geospatial Information ensure that the Department's geospatial data strategy aligns and integrates with the Department's mission and strategy.	The Department will complete a new version of the Commerce Geospatial Strategic Plan.	Complete - Action plan was due by 11/30/21. NOAA requested an extension and plan was submitted to OIG on 12/9/20. OIG requested additional information which NOAA submitted on 12/18/20.	3/31/21	In-progress.. The Geospatial Strategic Plan is in the DOC clearance process and it is anticipated that it will be finalized by end of April / May 2021.
OIG-21-001-A	The Department Has Made Progress Meeting Its Responsibilities Under the Geospatial Data Act But Must Improve Controls to Ensure Full Compliance	10/1/20	2	That the Deputy Secretary of Commerce and the Senior Agency Official for Geospatial Information define a system of internal control to ensure the geospatial data strategic plan is effectively implemented and that progress against it is appropriately tracked	The Department will define a system of internal controls.	Complete - Action plan was due by 11/30/21. NOAA requested an extension and plan was submitted to OIG on 12/9/20. OIG requested additional information which NOAA submitted on 12/18/20.	6/30/21	In-progress.
OIG-21-001-A	The Department Has Made Progress Meeting Its Responsibilities Under the Geospatial Data Act But Must Improve Controls to Ensure Full Compliance	10/1/20	3	That the Deputy Secretary of Commerce and the Senior Agency Official for Geospatial Information develop Department-wide procedures to ensure operating units consistently implement the Department's Policy on Planned Geospatial Acquisitions.	The Department will release a new policy and approach for planned geospatial acquisitions.	Complete - Action plan was due by 11/30/21. NOAA requested an extension and plan was submitted to OIG on 12/9/20. OIG requested additional information which NOAA submitted on 12/18/20.	9/30/21	In-progress.

[1] This report includes 6 recommendations, but one was specifically directed only to the Census Bureau and is not included in this document.

Department of Commerce
National Oceanic and Atmospheric Administration
IMPLEMENTATION STATUS OF GAO AND OIG RECOMMENDATIONS

OIG-21-001-A	The Department Has Made Progress Meeting Its Responsibilities Under the Geospatial Data Act But Must Improve Controls to Ensure Full Compliance	10/1/20	4	That the Deputy Secretary of Commerce and the Senior Agency Official for Geospatial Information work with the U.S. Department of the Interior to design internal control to ensure metadata on GeoPlatform is both accurate and current.	Commerce will complete a validation of the dates and accuracy of associated geospatial products.	Complete - Action plan was due by 11/30/21. NOAA requested an extension and plan was submitted to OIG on 12/9/20. OIG requested additional information which NOAA submitted on 12/18/20.	3/31/21	Complete. Recommendation closed 3/29/21.
OIG-21-001-A	The Department Has Made Progress Meeting Its Responsibilities Under the Geospatial Data Act But Must Improve Controls to Ensure Full Compliance	10/1/20	5	That the Deputy Secretary of Commerce and the Senior Agency Official for Geospatial Information in the interim, work with the U.S. Department of the Interior to notify GeoPlatform users that some metadata may not be current.	The Department will complete a validation of the dates associated with primary Department geospatial products.	Complete - Action plan was due by 11/30/21. NOAA requested an extension and plan was submitted to OIG on 12/9/20. OIG requested additional information which NOAA submitted on 12/18/20.	3/31/21	Complete. Recommendation closed 3/29/21.
OIG-20-047-A	The Joint Polar Satellite System: Cost Growth and Schedule Delay of a Key Instrument Acquisition Highlight the Need for Closer Attention to Contractor Oversight	9/10/20	1	That the NOAA Deputy Undersecretary for Operations require programs notify the Joint Agency Program Management Council before NOAA-funded NASA contracts exceed definitization timelines	NOAA will ensure all Programs notify the Joint Agency Program Management Council as part of routine reporting before a contract action exceeds the definitization timeline.	Complete - Action plan was submitted to OIG on 11/9/20. OIG requested additional information. OIG and NOAA had subsequent communications in December 2020 and January 2021 and NOAA provided additional information in January 2021.	02/26/21	Complete. Requested closure on 3/29/21. Recommendation closed 4/2/21.

Department of Commerce
National Oceanic and Atmospheric Administration
IMPLEMENTATION STATUS OF GAO AND OIG RECOMMENDATIONS

OIG-20-047-A	The Joint Polar Satellite System: Cost Growth and Schedule Delay of a Key Instrument Acquisition Highlight the Need for Closer Attention to Contractor Oversight	9/10/20	2	That the NOAA Deputy Undersecretary for Operations require a Joint Agency Program Management Council assessment before an integrated baseline review (IBR) requirement is removed, abridged, or its timing adjusted, for NOAA-funded NASA contracts or major contract modifications requiring earned value management.	NOAA will ensure that Programs present changes to contractually specified IBR or Earned Value (EV) activities to the Joint Agency Program Management Council	Complete - Action plan was submitted to OIG on 11/9/20. OIG requested additional information. OIG and NOAA had subsequent communications in December 2020 and January 2021 and NOAA provided additional information in January 2021.	02/26/21	Complete. Requested closure on 3/29/21. Recommendation closed 4/2/21.
OIG-20-047-A	The Joint Polar Satellite System: Cost Growth and Schedule Delay of a Key Instrument Acquisition Highlight the Need for Closer Attention to Contractor	9/10/20	3	That the NOAA Assistant Administrator for Satellite and Information Services ensure the Program adequately incorporates contract risks and executes prevention-focused surveillance as part of its quality assurance activities.	JPSS reviews the subcontractor status on a monthly basis and incorporates a risk-based approach to assessing sub-contractor performance.	Complete - Action plan was submitted to OIG on 11/9/20. OIG requested additional information. OIG and NOAA had subsequent communications in December 2020 and January 2021 and NOAA provided additional information in January 2021.	02/26/21	Complete. Requested closure on 3/29/21. Recommendation closed 4/2/21.

Department of Commerce
National Oceanic and Atmospheric Administration
IMPLEMENTATION STATUS OF GAO AND OIG RECOMMENDATIONS

OIG-20-047-A	The Joint Polar Satellite System: Cost Growth and Schedule Delay of a Key Instrument Acquisition Highlight the Need for Closer Attention to Contractor Oversight	9/10/20	4	That the NOAA Assistant Administrator for Satellite and Information Services coordinate with the Director of the NASA Goddard Space Flight Center to conduct a joint review of contractor performance evaluation practices and determine whether changes could more effectively motivate contractors to achieve desired outcomes for ongoing and future contract negotiations on NOAA-funded projects.	There are periodic executive dialogs between NESDIS and NASA Goddard Space Flight Center which will include discussions of how the award fee process can be used to better motivate contractor performance.	Complete - Action plan was submitted to OIG on 11/9/20. OIG requested additional information. OIG and NOAA had subsequent communications in December 2020 and January 2021 and NOAA provided additional information in January 2021.	02/26/21	Complete. Requested closure on 3/29/21. Recommendation closed 4/2/21.
OIG-20-047-A	The Joint Polar Satellite System: Cost Growth and Schedule Delay of a Key Instrument Acquisition Highlight the Need for Closer Attention to Contractor Oversight	9/10/20	5	That the NOAA Assistant Administrator for Satellite and Information Services coordinate with the Director of the NASA Goddard Space Flight Center to establish a working definition of “significant” cost overrun to help inform strategies that progressively motivate contractors to improve before accumulating excessive cost and schedule performance deficits, for ongoing and future NOAA-funded NASA contracts.	The Performance Evaluation Board (PEB) and the Fee Determination Officer (FDO) will be instructed to consider if a cost overrun is “significant” in accordance with the Award Fee parameters established in the Federal Acquisition Regulation (FAR), NASA FAR Supplement (NFS), and NASA Award Fee guide.	Complete - Action plan was submitted to OIG on 11/9/20. OIG requested additional information. OIG and NOAA had subsequent communications in December 2020 and January 2021 and NOAA provided additional information in January 2021.	02/26/21	In-progress Requested closure on 3/29/21. OIG requested additional information on 4/26/21 and NOAA working to provide information.

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GAO-20-216	Mixed-Use Fisheries: South Atlantic and Gulf of Mexico Councils Would Benefit From Documented Processes for Allocation Reviews	3/31/20	1	NMFS Assistant Administrator for Fisheries should work with the South Atlantic and Gulf of Mexico Councils, and other councils as appropriate, to develop documented processes for conducting allocation reviews.	South Atlantic and Gulf of Mexico councils have begun to develop and document their process for conducting allocation reviews and making their processes available to the public. NMFS will engage in this effort through the council process.	Complete - Action plan was submitted to GAO and Congress on 9/29/20	6/30/22	In-Progress
GAO-20-216	Mixed-Use Fisheries: South Atlantic and Gulf of Mexico Councils Would Benefit From Documented Processes for Allocation Reviews	3/31/20	2	NMFS Assistant Administrator for Fisheries should work with the South Atlantic and Gulf of Mexico Councils, and other councils as appropriate, to specify how the councils will document their allocation reviews, including the basis for their allocation decisions, whether fishery management plan objectives are being met, and what factors were considered in the reviews.	South Atlantic and Gulf of Mexico councils have begun to develop and document their process for conducting allocation reviews and making their processes available to the public. NMFS will engage in this effort through the council process.	Complete - Action plan was submitted to GAO and Congress on 9/29/20	6/30/22	In-Progress

Section 2. Implementation of GAO public recommendations issued no less than one year ago that are designated by GAO as 'Open' or 'Closed-Unimplemented.'

Open Recommendation(s) the Department has decided not to implement.

Include information on all open recommendations made one year or more ago that the Department / bureau do not plan to implement. GAO recommendations are open until officially closed by GAO.

Report Number	
Report Title	

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Issue Date	
Recommendation Number	
Recommendation	
Reason for the Decision not to Implement	

Alternative form if more than one report:

Report Number	Report Title	Issue Date	Recommendation Number	Recommendation	Reason for the Decision Not to Implement

Open Recommendation(s) the Department plans to implement.

Include information on all open recommendations made one year or more ago that the Department / bureau plans to implement. GAO recommendations are open until officially closed by GAO.

Report Number	
Report Title	
Issue Date	
Recommendation Number	
Recommendation	
Target Implementation Date	
Closure Request Pending with GAO (Yes/No)	
Clear Budget Implications (Yes/No)	

Alternative form if more than one report:

Report Number	Report Title	Issue Date	Rec. Number	Recommendation	Target Implementation Date	Closure Request Pending with GAO (Yes/No)	Clear Budget Implications (Yes/No)
GAO-20-81	Federal Research: Additional Actions Needed to Improve Public Access to Research Results	11/21/19	27	The National Oceanic and Atmospheric Administration Administrator should fully develop and implement a mechanism to ensure researcher compliance with the public access plan and associated requirements.	12/31/20. NOAA requested closure on 8/2/20 and GAO asked for additional information which NOAA provided. On 4/26/21, GAO had follow-up questions and	No	No

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					NOAA is working to provide information.		
GAO-20-81	Federal Research: Additional Actions Needed to Improve Public Access to Research Results	11/21/19	36	As the Subcommittee on Open Science moves forward, the National Oceanic and Atmospheric Administration co-chair, in coordination with other co-chairs and participating agencies, should take steps to fully implement leading practices that enhance and sustain collaboration.	10/30/20 NOAA requested closure on 8/2/20. GAO asked for more information. More time is needed to collaborate with other chairs of the Office of Science and Technology Policy, Subcommittee on Open Science.	No	No
GAO-19-653	Marine Debris: Interagency Committee Members Are Taking Action, but Additional Steps Could Enhance the Federal Response	9/25/19	3	The chair of the interagency committee, in coordination with member agencies, should develop and implement a process to analyze the effectiveness of the interagency committee's recommendations and strategies, and include the results in its biennial reports.	12/30/20 (original) 6/30/21 (extended)	No	Yes
GAO-19-653	Marine Debris: Interagency Committee Members Are Taking Action, but Additional Steps Could Enhance the Federal Response	9/25/19	4	The chair of the interagency committee, in coordination with member agencies, should develop a process to identify recommendations for priority funding needs to address marine debris, and include such recommendations in its biennial reports.	12/30/20 (original) 6/30/21 (extended)	No	Yes
GAO-19-265	Scientific Integrity Policies: Additional Actions Could Strengthen Integrity of Federal Research	4/4/19	7	The NOAA Administrator should develop mechanisms to regularly monitor and evaluate implementation of the agency's scientific integrity policy, including mechanisms to remediate identified deficiencies and make improvements where necessary.	9/30/20 (original) 2/28/21 (extended)	Yes – Closure requested on 3/11/21	Yes

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GAO-17-510	Hydrographic Surveying: NOAA Needs Better Cost Data and a Strategy for Expanding Private Sector Involvement in Data Collection	6/15/17	2	The Secretary of Commerce should direct the NOAA Administrator to develop a strategy for expanding NOAA's use of the private sector in its hydrographic survey program, as required by law.	12/31/19 (original) 6/30/21 (extended)	No	Yes
GAO-16-827	Federal Fisheries Management: Additional Actions Could Advance Efforts to Incorporate Climate Information into Management Decisions	9/28/16	2	In finalizing the regional action plans for implementing the NOAA Fisheries Climate Science Strategy, (1) incorporate the key attributes associated with successful performance measures in the final performance measures developed for the plans and (2) assess whether agency-wide performance measures may be needed to determine the extent to which the objectives of the Strategy overall are being achieved, and develop such measures, as appropriate, that incorporate the key attributes of successful performance measures.	12/31/17 (original) 10/31/18 (extended)	Yes. Although NOAA requested closure on 9/21/18, GAO will continue to monitor the status of NMFS efforts. NOAA provided several status updates in 2019 and 2020. Closure is still pending until fall 2021 because GAO wants to see if NMFS will update 7 regional action plans having performance metrics to include measureable targets.	Yes

Recommendations designated by GAO as "Closed-Unimplemented for the past 5 years (2015-2019). Future reports will cover a one-year period.

Report Number	
Report Title	
Issue Date	
Recommendation Number	
Recommendation	
Reason Not Implemented	

Alternative form if more than one report:

Report Number	Report Title	Issue Date	Recommendation Number	Recommendation	Reason Not Implemented
GAO-08-1045	Coastal Zone Management:	9/12/08	4	To enhance NOAA's ability to evaluate the overall progress of the	NOAA's National Ocean Service reported completion of this recommendation on 1/27/12. NOAA provided

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	Measuring Program's Effectiveness Continues to Be a Challenge			National Coastal Zone Management Program, NOAA should create targets for performance measures already developed that can be used to assess the effectiveness of the national program.	documentation to GAO for consideration of closure, but was not accepted. GAO closed this recommendation as unimplemented in December 2016.
GAO-11-800	Climate Monitoring: NOAA Can Improve Management of the U.S. Historical Climatology Network	8/31/11	2	To improve the National Weather Service's (NWS) ability to manage the USHCN in accordance with performance management guidelines and federal internal control standards, as well as to strengthen congressional and public confidence in the data the network provides, the Acting Secretary of Commerce should direct the Administrator of NOAA to develop an NWS agencywide policy, in consultation with the National Climatic Data Center, on the actions weather forecast offices should take to address stations that do not meet siting standards.	NWS issued a revised policy for stations in July 2017. The revisions included new direction to weather forecast offices regarding steps to take to maintain proper stations. However, the revised policy did not clarify under what circumstances stations that do not meet siting standards should be closed, relocated, or maintained in their present condition. GAO closed this recommendation as unimplemented in September 2017.
GAO-12-576	Geostationary Weather Satellites: Design Progress Made, but Schedule Uncertainty Needs to be Addressed	6/26/12	1	To improve NOAA's ability to execute GOES-R's remaining planned development with appropriate reserves, improve the reliability of its schedules, and address identified program risks, the Secretary of Commerce should direct the NOAA Administrator to assess and report to the NOAA Program Management Council the reserves needed for completing remaining development for each satellite in the series.	While the GOES program expanded its reporting of contingency reserve information to NOAA's Program management council by showing detailed contingency calculations, it does not report on contingency reserves broken out for each satellite in the GOES-R series. GAO closed this recommendation as unimplemented in August 2016.

Section 3. Implementation of OIG public recommendations issued no less than one year for which Final Action has not been Taken or Action Not Recommended has been Taken

Include information on all OIG recommendations that are still officially open. Commerce OIG recommendations are open until closed by the Department OIG Liaison.

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Report Number	
Report Title	
Issue Date	
Recommendation Number	
Recommendation	
Target Implementation Date	
Reason No Final Action Taken or Action Not Recommended Taken	
Closure Request Pending (Yes/No)	

Alternative form if more than one report:

Report Number	Report Title	Issue Date	Recommendation Number	Recommendation	Target Implementation Date	Reason no Final Action Taken or Action Not recommended taken	Closure Request Pending (Yes/No)
OIG-18-021-A	Polar Follow-On: NOAA Must Maintain Cost Efficiencies and Refine Launch Strategy for JPSS-3 and JPSS-4 Missions	7/9/18	6	That the Under Secretary of Commerce for Oceans and Atmosphere ensures that NOAA provides Congress with satellite system estimated costs in accordance with requirements for its major satellite programs specified in annual appropriations laws.	12/30/19 (original) 6/30/21 (extended)	NOAA requested closure on 6/25/20. DOC requested additional information on 7/31/20 and NOAA is working to obtain that information, which may not be available until June 2021 because it requires review and clearance by DOC and OMB.	No
OIG-20-006	NOAA's Office Of Marine And Aviation Operations Needs to Improve the Planning and Governing of Its Ship Fleet Recapitalization Effort	11/12/19	1	That the Director of NOAA Corps and OMAO develop a detailed contingency plan to reduce the risks associated with delays. The plan should address (a) capability and capacity gaps and (b) the cost of maintaining aging ships and utilizing alternatives.	03/31/20 (original) 06/30/21 (extended)	NOAA requested closure on 8/31/20. DOC requested additional information on 9/25/20, which may not be available until June 2021 because it requires review and clearance by DOC and OMB.	No
OIG-20-006	NOAA's Office Of Marine And Aviation Operations Needs to Improve the	11/12/19	3	That the Under Secretary of Commerce for Oceans and Atmosphere and Assistant Secretary of Commerce for Oceans and Atmosphere and Deputy NOAA Administrator develop a	09/30/20 (original) (05/31/21 (extended)	NOAA requested closure on 8/31/20. DOC requested additional information on 2/16/21, and NOAA is working to provide the information.	No

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	Planning and Governing of Its Ship Fleet Recapitalization Effort			detailed plan of program governance, which (a) delineates how OMAO will comply with applicable acquisition requirements, (b) clearly defines roles and responsibilities, (c) identifies stakeholder communication needs, and (d) defines a formal evaluation, approval, and decision follow-up process.			
OIG-20-006	NOAA's Office Of Marine And Aviation Operations Needs to Improve the Planning and Governing of Its Ship Fleet Recapitalization Effort	11/12/19	6	That the Under Secretary of Commerce for Oceans and Atmosphere and Assistant Secretary of Commerce for Oceans and Atmosphere and Deputy NOAA Administrator Provide a reconciliation report of the $3,387,714 unsupported costs to OIG.	07/31/20 (original) (06/30/21 (extended)	NOAA requested closure on 8/31/20. DOC requested additional information on 1/19/21, which NOAA is working to provide the information.	No
OIG-19-022-A	Geostationary Operational Environmental Satellite–R Series: Program Success Requires Added Attention to Oversight, Risk Management, Requirements, and the Life-Cycle Cost Estimate.	8/12/19	5	That the Deputy Under Secretary for Operations ensure that NOAA conducts analysis to determine distinct geomagnetic field measurement accuracy threshold and objective requirement specifications and ensure appropriately supported requirements are reflected in GOES-R program documents.	5/28/21	NOAA is working to implement the recommendation.	No
OIG-19-022-A	Geostationary Operational Environmental Satellite–R Series: Program Success Requires Added	8/12/19	6	That the Deputy Under Secretary for Operations ensure the NOAA Space Weather Prediction Center updates its geomagnetic field observation accuracy requirement validation documentation.	5/28/21	NOAA is working to implement the recommendation.	No

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	Attention to Oversight, Risk Management, Requirements, and the Life-Cycle Cost Estimate.						
OIG-19-022-A	Geostationary Operational Environmental Satellite–R Series: Program Success Requires Added Attention to Oversight, Risk Management, Requirements, and the Life-Cycle Cost Estimate.	8/12/19	7	That the Deputy Under Secretary for Operations ensure NOAA assesses whether GOES are the optimal satellites to achieve geomagnetic fi eld observation requirements, using an analysis of alternatives or similar cost-benefit approach.	03/31/22	NOAA is working to implement the recommendation.	No
OIG-18-021-A	Polar Follow-On: NOAA Must Maintain Cost Efficiencies and Refine Launch Strategy for JPSS-3 and JPSS-4 Missions	7/9/18	2	That the Assistant Administrator for Satellite and Information Services ensures that the JPSS program completes storage plans and cost analyses for instruments and integrated satellites.	1/31/22	NOAA is working to implement the recommendation.	No

Section 4. Discrepancies between this report and the semiannual reports submitted by the Commerce Office of Inspector General or reports submitted by the GAO

Report Number	
Report Title	
Issue Date	
Recommendation Number	
Recommendation	
Discrepancy	
Reason for Discrepancy	

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Alternative form if more than one report:

Report Number	Report Title	Issue Date	Recommendation Number	Recommendation	Discrepancy	Reason for Discrepancy

NOAA BACKUP FY20/22 APPR

U.S. DEPARTMENT OF COMMERCE

FY 2022 Annual Performance Plan

FY 2020 Annual Performance Report

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Overview of Bureau Accomplishments:

SO. 1.1: Expansion of Office of Space Commerce (OSC) - The office continued to expand Space Commerce engagement through relationships with other bureaus and agencies. Strong industry involvement in the space economy; the industry benefits from federal government support of the commercial space sector. **(NESDIS)**

SO. 1.1: Participation in National Space Council - The office supported National Space Council decision processes that led to the release of NOAA's new rules on remote sensing licensing, Presidential Executive Orders on "Strengthening National Resilience Through Responsible Use of Positioning, Navigation, and Timing Services" and "Encouraging International Support for the Recovery and Use of Space Resources," Space Policy Directive-5 (Cybersecurity Principles for Space Systems), a strategy paper on Moon/Mars development, the Artemis Accords for lunar cooperation, and other documents. **(NESDIS)**

SO. 1.1: Supporting Space Companies - The office engaged in continuous dialogue with U.S. space companies and organized a government-industry event focusing on commercial space startup innovation. NOAA supported the Secretary's visits and participation in ribbon cutting ceremonies for innovative space companies. **(NESDIS)**

SO. 1.1: DOC Space Situational Awareness - The Commerce Secretary and OSC Director testified before Congress on the urgency of establishing new SSA capabilities. NOAA supported a congressionally mandated review by the National Academies of Public Administration. **(NESDIS)**

SO. 1.1: Regulatory Reform - NOAA published a final rule streamlining it's licensing of commercial remote sensing satellite systems, significantly improving U.S. industry competitiveness and fulfilling the direction under Space Policy Directive-2. **(NESDIS)**

SO. 1.1: Promoting Weather Innovation - NOAA released its assessment of the Commercial Weather Data Pilot Round 2 and issued a solicitation in support of its first commercial radio occultation satellite data buy in support of operational weather forecasting. NOAA made contract awards to engage the commercial sector in producing new concepts for NOAA's future space-based observation architecture, and solicited ideas for future commercial data pilots. **(NESDIS)**

SO 2.1: Aquaculture Opportunity Areas (AOA) - NOAA selected regions (Gulf of Mexico and Southern California) to begin focused evaluation and analysis to identify the first two, of a total of ten, AOAs, as directed by the Executive Order on Promoting American Seafood Competitiveness and Economic Growth. An AOA is a defined area in federal or state waters that has been evaluated to determine its potential suitability for aquaculture. AOAs will encourage aquaculture to occur within areas that are compatible with a broad range of environmental, economic, social and cultural considerations. **(NMFS)**

SO 2.1: <u>OSTP Draft Regulatory and Research Plans</u> - NOAA and the Office of Science and Technology Policy interagency Subcommittee on Aquaculture completed drafts of two inter-agency plans to support domestic aquaculture development - the National Strategic Plan for Federal Aquaculture Research (2020-2024) and the Strategic Plan to Improve Aquaculture Regulatory Efficiency. The former documents Federal science and technology opportunities and priorities for aquaculture. The latter outlines Federal actions to improve the efficiency, predictability, and timeliness of reviewing, approving, monitoring, and enforcing regulatory requirements for commercial marine aquaculture ventures. (**NMFS)**

SO 2.1: <u>Sea Grant Supports the Nation's Aquaculture</u> - NOAA supported researchers at the Downeast Institute to address the industry-wide problem of total reliance on natural (wild) recruitment of blue mussels by creating an economically viable hatchery solution for seed production. The seed was successfully transferred to grow-out rafts, and market sized mussels were harvested. Sea Grant-funded researchers in Washington State successfully employed new innovations to produce sablefish fingerlings, working with a technician from the Jamestown S'Klallam tribe. The project will culminate in technology transfer to the Jamestown S'Klallam tribe to establish sustainable sablefish aquaculture benefiting the tribal community. **(OAR)**

SO 2.1: <u>Adapting to Changes Necessitated by the COVID-19 Pandemic</u> - NOAA provided funding through its Sea Grant programs to help hard-hit suppliers of seafood to restaurants survive the COVID-19 lockdown. The programs helped develop direct marketing resources and create online resources to connect consumers directly with seafood producers. In addition, several programs utilized funding to purchase farmed shellfish for restoration activities. These efforts helped commercial fishermen and aquaculture producers sell their product, allowing them to maintain a revenue stream during a time of crisis. (**OAR)**

SO 2.1: <u>Ecology and Oceanography of Harmful Algal Blooms (ECOHAB)</u> - NOAA completed integrated modeling of the harmful genus *Pseudo-nitzschia spp.* to support ecosystem prediction and environmental management in the southern California current system. A draft final report, website content, executive and technical briefing materials and other appropriate products on potential management ramifications of this modeling effort were developed. In addition, workshops were conducted with executive managers and lead technical staff of stakeholder agencies and final products were refined based on management needs. **(NOS)**

SO 2.1: <u>Entanglement Simulator</u> - The Virtual Reality Simulator 1 (mussel longlines with right and humpback whale) was developed to assess entanglement risk of protected species and will serve as an important tool in support of sustainable expansion of offshore aquaculture. **(NOS)**

SO 2.2: <u>Improved Efficiency and Timeliness of Consultation and Permitting Processes</u> - NOAA continued to improve the efficiency and timeliness of endangered species consultation. Time to complete informal consultations remained below the regulatory standard of 60 days, at an average of just 43 days. The number of formal consultations exceeding statutory deadlines decreased by more than 50 percent from 74 to 36. We also completed 55 percent more MMPA incidental take authorizations than in 2019. **(NMFS)**

SO 2.3: <u>100% of CARES Act Funds Obligated (COVID-19)</u> - NOAA has obligated 100% of its $300 million in CARES Act funds for fisheries assistance. Of 30 state, territorial, and tribal spend plans, 28 representing $249 million have received final approval for

distribution. The final plan has been received and is under review. Just over $153 million has been distributed to fishery participants. **(NMFS)**

SO 2.3: U.S. Fish Stocks Continue Positive Trend - The Status of the U.S. Fisheries report for 2019 shows 93 percent of the stocks managed are not subject to overfishing and 81 percent are not overfished. Forty-seven U.S. marine fish stocks have been rebuilt since 2000. Ending overfishing and rebuilding stocks supported $244 billion of commercial and recreational sales and 1.74 million jobs in 2017. This shows that the U.S. fishery management system is achieving its long-term sustainability goals. **(NMFS)**

SO 2.3: First Successful Spiny Lobster Assessment in 15 Years Completed - NOAA successfully completed its first assessment of Caribbean spiny lobster in nearly 15 years. This assessment is one of, if not the first successful level 6 (Statistical Catch-at-Age) assessments reviewed and accepted by the Caribbean Fishery Management Council. All three stocks were found to be neither overfished nor undergoing overfishing. **(NMFS)**

SO 2.3: Proposed Marine Mammal Deterrence Guidelines Published - NOAA proposed guidelines for safely deterring marine mammals from damaging fishing gear, catch, or personal/public property. As some marine mammal populations have increased, and in some cases caused significant damage to property and fish catch, providing a legal means for protecting property while minimizing illegal human-animal interactions is essential and long overdue. **(NMFS)**

SO 2.3: Key Step Taken to Prevent Extinction - Working with partner organizations, NOAA released captive-bred white abalone into the wild for the first time - a major step towards bringing white abalone back from the brink of extinction. **(NMFS)**

SO 2.3: Enhancing Safety of Marine Navigation across the U.S. - In FY 2020, NOAA's Physical Oceanographic Real-Time System (PORTS ®) increased safe navigation in congested shipping lanes and seaports in Florida, New York, New Jersey, Texas, and Massachusetts. In partnership with the U.S. Navy, two new PORTS ® in Georgia and New Hampshire and a new tide station in Maine, provide safe navigation while assisting with protecting shipyard personnel, critical facilities, and U.S. Navy submarines. **(NOS)**

SO 2.3: Aeronautical Survey Program - NOAA's National Geodetic Survey's Aeronautical Survey Program (ASP) partners with the Federal Aviation Administration (FAA) to provide critical flight information, ensuring the efficient use of airspace. The ASP's economic benefit to the U.S. economy ranges from $3 billion to $13.2 billion over the next decade and retains an estimated 3,438 to 12,849 jobs. **(NOS)**

SO 2.3: Marine Economy Worth $373 Billion in GDP - NOAA's released in June 2020, the first-of-its-kind national estimates for all ocean, coastal, and Great Lakes economic activities indicate that the marine economy provided $373 billion to the gross domestic product (GDP), employed 2.3 million individuals, and generated $617 billion in sales in 2018. **(NOS)**

SO 2.3: Mapping U.S. Marine and Great Lakes Waters - In FY 2020, NOAA advanced its commitment to optimizing the safety and utility of the nation's marine highway infrastructure and working towards mapping the full extent of the U.S. waters to modern standards. **(NOS)**

SO 3.3: Expanding our Supercomputing Capacity - NOAA awarded a contract for the Weather and Climate Operational Supercomputing System which provides a significant upgrade to computing capacity, storage space, and interconnect speed. This increase will triple the capacity and double the storage and interconnect speed when it becomes fully operational in mid-2022. This upgrade keeps the agency's supercomputing capacity on par with other leading weather forecast centers around the world. It also allows NOAA to unlock possibilities for better forecast model guidance through higher-resolution and more comprehensive Earth-system models, using larger ensembles, advanced physics, and improved data assimilation. **(NWS)**

SO 3.3: NOAA High Performance Computer Rated Among Top 500 in the World - NOAA's newest high performance computer, Hera, used for research to advance weather, climate, and ecosystem prediction, was named number 88 among the top 500 high performance computers in the world based on computing capacity. The addition of Hera and recent upgrades to other high performance computers has enabled NOAA to more than double its research computing capacity over the last year from 8 petaflops to 17 petaflops. **(OAR)**

SO 3.3: Improving Flood Inundation Maps for Emergency Managers and Decision Makers -In FY 2020 major milestones were achieved in furthering the Agency Priority Goal to mitigate flood impacts by demonstrating improved decision support services to emergency managers. The NWS successfully initiated the demonstration of using Flood Inundation Mapping (FIM) across the Northeast using streamflow forecasts from both the National Water Model (NWM) and Northeast River Forecast Centers (RFC) using the Replace & Route technique. The Replace and Route technique uses the official RFC Advanced Hydrologic Prediction Service (AHPS) forecast and routes the water through the NWM stream network to show the aerial extent of flooding. **(NWS)**

SO 3.3: Public Release of Modeling Code with Community Support – In FY 2020, the NWS released Version 1 of the Unified Forecast System (UFS) weather model to the community through github.com (public version) and NOAA Virtual Lab (developer's version). Version 1 of the UFS, also called the NEMS FV3GFS Modeling System, is a significant enhancement allowing users to easily configure the model on a variety of computational platforms and run forecast experiments with pre-processing and post-processing tools. This is a critical step towards a true community modeling framework that will advance weather modeling skill and international leadership in the area of numerical weather prediction. **(NWS)**

SO 3.3: Severe Weather Response during COVID-19 - During multiple severe weather outbreaks in April 2020 and amidst the COVID-19 pandemic, the coordination across WFOs, RFCs, NWC, SPC, WPC, and ROCs was truly exemplary. Working together, whether at home or in the office, NWS employees provided consistent and accurate forecasts, warnings, and pre-event messaging about public sheltering informed by CDC guidelines. NWS recognized that local officials would increasingly need highly localized weather forecasts to ensure safe testing operations as the number of COVID-19 testing stations across the country grew. The NWS

found a solution by identifying a prototype Spot forecast tool used in WFOs and made the tool operational, allowing critical localized forecasting for testing stations. **(NWS)**

SO 3.3: NOAA Launches Major Ocean Field Campaign to Improve Weather and Climate Prediction - NOAA launched the Atlantic Tradewind Ocean-Atmosphere Mesoscale Interaction Campaign to investigate how the ocean, atmosphere, and shallow clouds work together to create the weather and climate we live in. NOAA scientists were able to observe the ocean, air, and clouds in near isolation from the impacts of storms and hurricanes, which will help improve understanding of how the ocean makes shallow clouds and how these clouds affect larger weather and climate patterns**. (OAR)**

SO 3.3: NOAA Weather Models Improve Forecasts for Smoke and Air Pollutants (HRRR-Smoke and GFS-Aerosols) - NOAA transitioned two weather research models, the High Resolution Rapid Refresh-Smoke model (HRRR-Smoke) and GFS-Aerosols, to NWS operations. The HRRR-Smoke model is the first in the U.S. to forecast smoke's impact on a number of weather variables. GFS-Aerosols forecasts the distribution of some primary air pollutants to improve weather forecasts and is capable of predicting the atmospheric impact of volcanic eruptions. **(OAR)**

SO 3.3: Earth Prediction Innovation Center - NOAA developed an Earth Prediction Innovation Center (EPIC) to serve as NOAA's core research-to-operations pipeline for advancing community-developed enhancements to the Next Generation Global Prediction System. EPIC awarded a contract, on April 26, for the creation of a publicly accessible community earth system model. **(OAR)**

SO 3.3: Extended Warning Time for Tornadoes - NOAA will establish a Tornado Warning Improvement and Extension Program (TWIEP) to extend tornado warning lead times to at least one hour to reduce the loss of life and economic losses from tornadoes. **(OAR/NWS)**

SO 3.3: Hazard Services - NOAA checked a new hazardous weather forecast application for winter weather watches/warnings/advisories into NWS AWIPS Baseline Repository. It is Hazard Services version 2 and it focuses on long-duration winter weather hazards and phase 1 Hazard Simplification messaging and consolidation process of Hydrology hazards. **(OAR)**

SO 3.3: Hurricane Forecast Dropsonde - NOAA transitioned dropsonde drift data into NWS operational models to improve hurricane forecasts. A fundamental problem for hurricane assimilation is that dropsondes capture the release point instead of the observation point. This leads to small errors in the environment around a storm, which can result in unacceptable errors at the inner core of a storm. **(OAR)**

SO 3.3: NOAA Improves Harmful Algal Bloom Forecasts with New 3-D model - Harmful algal blooms (HABs) are out-of-control algal growths that can contaminate drinking water, create health problems for swimmers and pets, and interfere with boating and fishing. NOAA developed a daily HAB model for Lake Erie, which allows scientists to better understand and predict the size of the algal bloom. Forecasters can use the new model to predict how extensively the bloom has spread from the lake's surface to its floor. **(OAR)**

SO 3.3: Fleet Recapitalization - NOAA continued acquisition of two General Purpose Oceanographic Ships through a Navy assisted acquisition. Preliminary Designs by three competing contractors were completed on time. The Navy and NOAA teams conducted the design evaluations and selected one contractor for the multi-year Detail Design and Construction. **(OMAO)**

SO 3.3: Aircraft Recapitalization - NOAA continued its acquisition of a new Gulfstream G550 aircraft and awarded Phase 1 Modifications (design and parts purchase) in late FY20. The G550 is a replacement for NOAA's current Gulfstream G-IV, but offers enhanced data collection technologies including those for advanced climate data. A new King Air aircraft acquisition continued under another contract. This second platform will be outfitted with remote sensing equipment to measure snow water equivalent data for flood, river level and water supply forecasts. **(OMAO)**

SO 3.3: Unmanned Systems (UxS) - OMAO, in collaboration with the OAR and the UxS Executive Oversight Board, provided over $3 million to projects across NOAA to evaluate emerging technologies, determine where opportunities exist to more cost effectively carry out NOAA's mission-critical activities using UxS, and deploy these systems rather than using existing means. More than 50 projects applied for the program requesting $18 million. With UxS funds, programs across NOAA will use UxS to assess protected species, develop under-ice ecosystem observations, ecosystem monitoring, survey hydrologic and storm damages, validate satellite data, collect data on coastal change, and improve hurricane intensity prediction. **(OMAO)**

SO. 3.3: Commercial Data Purchase - NOAA initiated operational data purchases to include Global Navigation Satellite System (GNSS) Radio Occultation (RO) data in NOAA's numerical weather prediction models via contract in 2020. NOAA plans to initiate operational use of GNSS-RO data in FY 2021. **(NESDIS)**

SO. 3.3: Common Cloud Pilots Completion - NOAA successfully completed Phase II of the Cloud Pilots, demonstrating secure ingest of data, product generation, information technology (IT) security, and archive through a NESDIS Common Cloud Framework. NOAA transitioned initial operational services to a cloud architecture in FY 2021, which is more efficient, flexible, and scalable than on-premise systems and enables advanced processing capabilities, such as artificial intelligence and machine learning. **(NESDIS)**

SO. 3.3: Strengthened Commercial Partnerships for Next-Generation Satellite Architecture: NOAA awarded 32 contracts per a subset of Broad Agency Announcement respondents in FY20 for instrument and mission concept studies for Geostationary and Extended Orbit (GEO-XO) and Low Earth Orbit (LEO). **(NESDIS)**

SO. 3.3: New Tools to Inform and Protect the Public from Harmful Algal Blooms (HABs) - NOAA's respiratory forecast for Pinellas County, Florida, expanded to include Sanibel Island, informs beachgoers of the severity of airborne red-tide toxins, which is particularly important for those with respiratory conditions. The forecast is part of NOAA's ecological forecasting initiative, aiming to deliver accurate and timely forecasts to coastal managers and the public. **(NOS)**

SO 3.3: Groundbreaking Effort for Florida Keys Coral Restoration – In FY2020, NOAA and its partners announced a decades-long coral reef restoration effort, Mission: Iconic Reefs, to restore seven iconic reefs in Florida Keys National Marine Sanctuary. This

groundbreaking approach represents one of the largest investments ever to revitalize the Florida Keys' diverse and economically valuable marine ecosystem on an unprecedented scale, which attracts over five million visitors a year who support $4.7 billion in spending and income. **(NOS)**

SO. 3.3: Big Data Program (BDP) - NOAA signed contracts with three Cloud Service Providers in late FY20. The BDP team successfully transitioned from Cooperative Research and Development Agreement (CRADA) to the BDP contracts in Jan of 2020 and continued to provide datasets that were agreed upon under the CRADA. Since the contract award, NOAA has increased the frequency of communication with the Cloud Service Providers, and is in the process of building engagement strategies with each. The BDP has also increased the amount of datasets in the BDP and started moving data that is being stored as an adjunct to the Cloud Utility Contract, thus executing one of the egress provisions of the BDP contract. **(OCIO)**

SO. 3.3: High Performance Computing (HPC) - The Weather and Climate Operational Supercomputing System (WCOSS) contract ($505M) was awarded, and transition activities have been extended due to COVID supply chain challenges. Also, Enterprise cloud compute capability has been acquired with Google, Amazon, and Microsoft; significant network and storage upgrades were started to support increasing R&D HPC capability and future WCOSS expansion; and incubator awards were made for NOAA Artificial Intelligence / Machine Learning (AI/ML) and Cloud compute activities**. (OCIO)**

Planned Actions for FY 2022:

SO. 1.1: Expansion of Space Commerce - Continue the Space Commerce engagement through relationships with other bureaus and agencies. Strong industry involvement in the space economy; the industry benefits from federal government support of the commercial space sector. **(NESDIS)**

SO. 1.1: Regulatory Reform - Define a USG policy for oversight regarding commercial/civil space activities and regulatory authorities. (**NESDIS)**

SO. 1.1: Expand Commercial Space Activities - Funding allows NOAA to proceed with requirements definition, analysis of alternatives, and demonstration of capabilities to support the commercial industry. **(NESDIS)**

SO 2.1: Aquaculture Opportunity Areas (AOA) - NOAA will select the third and fourth areas to begin focused evaluation and analysis to continue to identify a total of ten AOAs. These actions are mandated by the Executive Order on Promoting American Seafood Competitiveness and Economic Growth. In addition, NOAA will be working to complete programmatic environmental impact statements for each of the first two AOAs with a target of completing the EISs within two years of when they were identified. This schedule is slower than what is directed in the E.O., but is what is realistic under expected resources in FY21 and FY22. **(NMFS)**

SO 2.1: Implementation of National Aquaculture Development Plan - NOAA and the White House OSTP interagency

Subcommittee on Aquaculture will complete and implement a National Aquaculture Economic Development Plan, the National Strategic Plan for Federal Aquaculture Research (2020-2024), and the Strategic Plan to Improve Aquaculture Regulatory Efficiency. Together, these plans will comprise an updated National Aquaculture Development Plan that will also provide interagency science and technology coordination to improve regulatory efficiency, research and technology development, and economic growth. **(NMFS)**

SO 2.1: Siting Analyses for AOAs and Multiple Commercial Finfish and Shellfish Aquaculture Projects – NOAA will complete atlases for the third and fourth AOAs, reports detailing siting analysis, maps and results of suitability analysis for at least five commercial finfish and shellfish aquaculture projects located in federal waters of the West, Northeast and Gulf of Mexico regions of the U.S. **(NOS)**

SO 2.1: Sea Grant Builds Resilient Coasts - Sea Grant's research and engagement in coordination with partners will make coastal communities more resilient to natural hazards and changing conditions. Examples of this work include understanding local risks and needs; filling critical information gaps through cutting edge research and data collection with communities; expanding the use of decision-making tools; developing and implementing solutions with stakeholders, including underserved communities; and essential partnership coordination and information sharing. **(OAR)**

SO 2.1: Building Capacity for Land-Based Atlantic Salmon Aquaculture in the U.S. - To help build capacity for the rapidly expanding Atlantic salmon aquaculture industry, NOAA funded the Recirculating Aquaculture Salmon Network (RAS-N), a national public-private consortium aimed at facilitating the growth of environmentally sustainable and economically feasible Atlantic salmon production. In FY 2022, the RAS-N consortium will develop a consensus road map/strategic plan and demonstration projects that will help policymakers, federal agencies, and industry identify and responsibly allocate resources to promote an economically and environmentally sustainable land-based US Atlantic salmon industry. **(OAR)**

SO 2.1: Collaboration through the Seaweed Hub - NOAA has established the National Seaweed Hub to serve as a science-based, non-advocacy resource for the domestic seaweed industry. The Hub will bring together seaweed stakeholders from across the country in stakeholder-driven work groups guided by Sea Grant Extension professionals to find a path forward in addressing challenges, finding solutions to needs, and pursuing opportunities for growth. **(OAR)**

SO 2.1: Promoting Great Lakes Aquaculture - The Great Lakes Aquaculture Collaborative is a three-year project that seeks to foster science based initiatives that support aquaculture industries in the Great Lakes region that are environmentally responsible, competitive, and sustainable. **(OAR)**

SO 2.3: Fishery Management Measures – NOAA will develop, implement, monitor and adjust (if required) Annual Catch Limits (ACLs) and Accountability Measures (AMs). **(NMFS)**

SO 2.3: Promote Management and Trade – NOAA will negotiate bilateral arrangements and trade agreements with other countries consistent with the policies required of U.S. fishermen. **(NMFS)**

SO 2.3: Transition to Next-Gen Stock Assessments – In partnership with regional management councils, NOAA will continue to transition their activities to be more in-line with the Next-Gen Stock Assessment to Management Process. This process partitions new methods and techniques out from previously used and/or reviewed stock assessment approaches to streamline the stock assessment process. **(NMFS)**

SO 2.3: Climate-Ready Fisheries – NOAA will integrate climate science into fisheries and protected species assessments and management to address the impacts of climate change on fisheries, ecosystems, and communities. Long-term monitoring will allow us to better understand climate change-related impacts and effectiveness of our actions. **(NMFS)**

SO 2.3: Climate-Vulnerable Species – NOAA will assess the effects of planned offshore energy activities on Endangered Species Act (ESA) listed species and critical habitat, Essential Fish Habitat (EFH), and MMPA incidental take authorizations. We will work with the Bureau of Ocean Energy Management (BOEM) to minimize the effects of offshore energy projects on protected resources, fisheries, and important habitats in the region, including through the National Environmental Policy Act (NEPA). **(NMFS)**

SO 2.3: Safe and High Quality Observer Coverage - NOAA will provide safe and high-quality monitoring in 65 fisheries nationwide, with a goal of maintaining high-priority observer programs and, as necessary, expanding observer coverage in existing fisheries and implementing new observer programs for fisheries identified with monitoring needs related to bycatch and protected species interactions by supporting approximately 73,000 observed sea days. **(NMFS)**

SO 2.3: Improved Economic Tools and Statistics - NOAA will expand implementation of an integrated Bioeconomic Length-structured Angler Simulation Tool, the Social Indicator Toolbox, and FishSET—a spatial economics toolbox; assess the economic performance of fisheries; and predict the cost/benefits of stock rebuilding programs. **(NMFS)**

SO 2.3: Improved Fisheries Statistics - NOAA will improve population dynamics/assessment/management model development and data analysis tools to support fisheries science programs and improve data dissemination and sharing of integrated data and analyses (climatology, socio-economic, ecosystem, fishery-dependent, and fishery-independent), both internally and externally. **(NMFS)**

SO 2.3: Fishery-Independent Assessments - NOAA will perform fishery-independent assessments of reef fish abundance and life history characteristics of economically and ecologically important reef fish species in shelf and upper slope waters from Cape Lookout to Cape Canaveral. **(NMFS)**

SO 2.3: Continued Focus on Severely Endangered Species - NOAA will continue to reduce mortality of and harm to Species in the Spotlight, an initiative to bring greater attention and marshaling of resources to save species most highly at risk of extinction. **(NMFS)**

SO 3.3: Accelerated Improvement to NOAA's Weather Forecast - Operational improvements to NOAA's weather forecasts are generated by the transition of scientific and technological advances into NWS operations. The Joint Technology Transfer Initiative supports the demonstration stage of the transition and provides active management of the transition process, prior to deployment into operations. **(NWS/OAR)**

SO 3.3: NOAA's National Mesonet Program - The Program will use data sets within the current program, and procure non-federal data, to improve NWS forecasts and timely decision support for small-scale, high impact weather events. **(NWS)**

SO 3.3: National Weather Service Integrated Dissemination Program (IDP) -NOAA will increase the IDP network capacity in College Park, MD, and Boulder, CO, to improve the availability and access of mission critical forecast products, watches, warnings, and observations. **(NWS)**

SO 3.3: Flood Inundation Mapping - NOAA will begin development of a hybrid-cloud approach utilizing both on-premise private cloud and public cloud services that will provide capability to routinely generate and disseminate operational real-time Flood Inundation Mapping 24/7 for the full domain of the National Water Model. **(NWS)**

SO 3.3: Sub-Seasonal to Seasonal (S2S) Decision Support Services - NOAA will begin an assessment of its decision support services in the week two to three months' time horizon (S2S) to mitigate the impacts of extreme events and enable a resilient society. NOAA plans to conduct stakeholder meetings to understand key climate-based impact decisions and how S2S information can inform those decisions. Based on stakeholder input, NWS and NOAA labs will begin product/service development. **(NWS)**

SO 3.3 Supporting Minority Internship Opportunities - NOAA will formally establish the June Bacon-Bercey (JBB) Internship Program. NOAA will develop policies and procedures, identify mentors, and engage NWS leadership across all offices to support a recruitment program that is inclusive of Black, Indigenous, and People of Color (BIPOC) students. **(NWS)**

SO 3.3: Data-source Agnostic Common Services (DACS) - NOAA will utilize data and observations from a diverse array of partner and commercial systems and take current hardware and software to a cloud-enabled framework to generate products and services. **(NESDIS)**

SO 3.3: Precipitation Prediction Grand Challenge – NOAA will enhance the skill of precipitation predictions across weather and climate timescales in a research environment and for potential transition to operations. OAR will improve understanding of key physical processes operating in the atmosphere and oceans, identify ways to improve model representations of these processes, and reduce the systematic biases in NOAA models, which will lead to demonstration of improved precipitation forecast skill**. (OAR)**

SO 3.3: Fire Weather - NOAA will develop a collaborative and integrated fire weather research program to enable new research into the coupled modeling for both the short-term fire-atmosphere and S2S modeling systems. A new NOAA Fire Weather Testbed will be established that will bring together OAR, NWS, NESDIS, and emergency managers from across the fire weather community to

develop new impact-based decision support tools, products, and models, which will improve the ability to provide timely and accurate guidance to safeguard lives and property and manage downstream air quality impacts. **(OAR)**

SO 3.3: Phased Array Radar - NOAA will advance priority activities in Tornado/Severe Storm Research line through the implementation of the Weather Radar Follow-On Plan that was delivered to Congress in 2020. **(OAR)**

SO 3.3: Providing Climate Change Projections out to 2050 to Inform Risk Management - NOAA will develop standardized and accessible climate projections with co-developed society-relevant data delivery services to improve climate risk information equity and assist decision making across a wide range of stakeholders and economic sectors. There is a critical need for improved projections of how the climate will change on regional scales through the next several decades (2021 through 2050). **(OAR)**

SO 3.3: Weather and Climate Drivers and Marine Resource Responses - NOAA will provide decision-makers with the information and tools they need to prepare for changing oceans and Great Lakes, reduce climate impacts, and increase resilience of Living Marine Resources and the communities that depend on them. **(OAR)**

SO 3.3: Global-Nested High-Resolution Model – NOAA will develop a global high resolution atmospheric model with a 3km or below resolution aimed at improved understanding and prediction of extreme events on all time scales beginning at 2 weeks, and includes an observational program for boundary layer and clouds, needed to refine this resolution. This will provide improved forecasting skill for extreme events with earlier warnings and more accurate spatial patterns for those events**. (OAR)**

SO 3.3: Sustained Atmospheric Observations – NOAA will support and enhance its atmospheric observing systems that will allow NOAA to support, as a requirement of the Paris Climate agreement, a Global stocktake. This will assess the progress in reducing GreenHouse Gases and mitigating the climate impacts. In order to evaluate progress on meeting Nationally Determined Contributions (NDCs) and the effectiveness of NDCs in limiting global average temperature increases to 2 degrees C above pre-industrial levels. **(OAR)**

SO 3.3: Enhancing Regional and Community Resilience by Scaling Up RISA Program and "Climate-Smart" Communities Initiative - NOAA will work with regions and communities to co-produce, mainstream, and provide training for lasting and equitable climate resilience. The proposal builds on and extends the proven capabilities of the Regional Integrated Sciences and Assessments program and the U.S. Climate Resilience Toolkit (USCRT) to advance adaptation measures and resilience planning at regional and local scales, while prioritizing environmental justice. **(OAR)SO 3.3: Uncrewed Systems -** NOAA will enhance the evaluation and advancement of operational readiness of a full spectrum of NOAA Uncrewed Systems (UxS) mission concepts, which encompass both aircraft and maritime systems. NOAA will request proposals for R&D related to UxS concepts and technologies to support missions across NOAA's Line Offices. **(OAR)**

SO 3.3: Ship Acquisitions - In FY22, construction will continue on the vessels in NOAA's Fleet Plan for the NOAA Class A Ships, to be named Oceanographer and Discoverer, with primary missions of oceanographic monitoring, research and modeling. The NOAA

Class B (charting and surveying missions) is planning to release an RFP in FY22, and will continue with the multi-year Detail Design and Construction phase afterwards. Early requirements analysis and initial concept designs for the NOAA Class C (primary mission of assessment and management of living marine resources) are planned and will continue as the program develops. (**OMAO)**

SO 3.3: Ship Total Days-At-Sea (DAS) - NOAA will continue to support scientific data collections with its current fleet of 15 ships configured for various mission capabilities. The FY22 DAS target is projected to increase above the NOAA FY21 target. NOAA has increased emphasis on multi-year maintenance actions and technology updates to keep the fleet capable of delivering service within resources received. Total DAS will include both mission and non-mission. **(OMAO)**

SO 3.3 Aircraft Acquisitions - FY21 funding was used to award the Phase 2 activities (physical modification and certification) to the prime contractor for acquisition of the G550 aircraft. In FY22, the contractor is expected to complete the aircraft design and start modifications to the Baseline ('green') aircraft. NOAA requests funding to bring a second specialized high-altitude Hurricane Hunter on-line to meet national needs as outlined in the Weather Research and Forecasting Innovation Act (the Weather Act). **(OMAO)**

SO 3.3 Pier Romeo Recapitalization Project - In FY22, NOAA will continue the FY21 work on the Charleston, South Carolina, NOAA/OMAO pier ROMEO recapitalization project. The pier is located in a critical southeast location for NOAA ships, however, the facility condition requires demolition and reconstruction. Site improvements will include integrating the new pier construction to support NOAA ships *Nancy Foster* and *Ronald H. Brown,* and other visiting vessels into the available space. **(OMAO)**

SO 3.3 Naval Station (NAVSTA) Newport, Rhode Island OMAO Ship and Support Facility Consolidation - NOAA will continue the FY21 start of consolidation activities for the NAVSTA Newport, RI location. Currently NOAA has two ships homeported at NAVSTA, the *Henry B. Bigelow* and *Okeanos Explorer*. In order to remain in compliance with the CENOTE Act, NOAA is required to co-locate with the NAVY whenever possible to increase technological sharing capabilities. This consolidation also aligns with NOAA's regional facilities plans. **(OMAO)**

SO 3.3: Initiate the LEO Weather Satellites Program - NOAA will initiate a Low Earth Orbit (LEO) Weather Satellites program that will ultimately serve as the follow-on to the Polar Weather Satellites (PWS) program. NOAA proposes to prove the viability of a "small sat" for use on a future operational mission and to provide resiliency to the PWS program. **(NESDIS)**

S.O. 3.3: Space Weather Observations - NOAA proposes to initiate the Space Weather Next program that will sustain, improve, extend, and mitigate potential gaps in observations to support NOAA space weather forecast operations as authorized by the PROSWIFT Act and driven by the National Space Weather Strategy and Action Plan. NOAA will also continue to support the Space Weather Follow-On (SWFO) mission at Lagrange point 1, which will ensure continuity of space weather data beyond Deep Space Climate Observatory (DSCOVR) and Solar and Heliospheric Observatory (SOHO). **(NESDIS)**

S.O. 3.3: Geostationary Extended Observations (GeoXO) - NOAA will continue the formulation of the GeoXO satellite program scope and architecture to advance Earth observations from geostationary orbit. GeoXO will supply vital information to address major environmental challenges of the future in support of U.S. weather, ocean, and climate operations. **(NESDIS)**

S.O. 3.3: Joint Venture Partnerships - NOAA is requesting additional funding to expand activities with other agencies and the commercial sector that investigate, mature, and demonstrate new technologies and capabilities that could potentially be incorporated into NOAA satellite architectures and associated enterprise products and services portfolios. **(NESDIS)**

SO 3.3: Continue Commercial Data Program - NOAA is requesting additional funding for the purchase of commercial Global Navigation Satellite System (GNSS) Radio Occultation (RO) data and continued development and sustainment of the infrastructure and capability to securely import, transfer, process, and store external data from commercial providers for operational use. NOAA will also continue to support commercial weather data pilots, which are critical to NOAA's future satellite architecture as they assess the operational viability of potential future commercial capabilities. With the additional pilot project work, NOAA will continue to assess new capabilities that are available on the commercial market and test commercially available capabilities based on market research, in accordance with the NOAA Commercial Space Policy. **(NESDIS)**

SO. 3.3: Big Data Program (BDP) - NOAA anticipates executing option period one of the BDP contract if there are no contract performance issues during FY20 and FY21. During FY22, BDP plans to continue expanding its data holdings and increasing the amount of data that is being stored under the 15PB BDP allocation. In addition, the BDP team plans to continue developing processes for populating the NOAA Data Lake, executing those processes and fully supporting the implementation of the Earth Prediction Innovation Center (EPIC). The BDP plans to continue to build as a program and increase staff and resources as needed with increased participation and workloads. **(OCIO)**

SO. 3.3: High Performance Computing (HPC) - Continue to increase compute available to NOAA scientists across all high performance computing solutions while increasing software and model portability on internal and external compute systems. Increase network and storage capacity specifically at Fairmont to fully support WCOSS's increased capability. Support AI/ML/Cloud initiatives through R&D HPC Integrator contract and Incubator program. **(OCIO)**

Analysis of Performance Indicators:

Explanation of Trends

NMFS

- Despite the pandemic, NMFS performance improved in FY20 after several years of plateauing, with one important exception. The Fish Stock Sustainability Index (FSSI) increased by 11 points, and ESA permit processing efficiency

improved significantly. However, the percentage of ESA-listed species with stable or increasing populations fell below 30% due to insufficient funds for assessments. Attaining improvements in performance has become more challenging because:

- Performance improvements in earlier years mean that further improvement is possible only by solving the most difficult problems, both from a management and an assessment standpoint.
- Assessment resources have been stretched thin by the mandate to set annual catch limits (ACL) for all fish stocks.
- Between FY16 and FY19, days-at-sea gathering data fell over 25%. Deferred maintenance in the NOAA Fleet caused NMFS to lose 1,266 sea days from FY14-19 based on the number of sea days planned for each year, and due to the COVID-19 pandemic, NMFS experienced a further loss of 1,030 days at sea in FY 2020 alone, 78% of a planned 1,318.
- Assessment challenges due to model instability resulting from a combination of distributions shifts, increased environmental variability, and changes to stock baseline productivity levels have impeded and, in some cases, reversed progress in understanding the status and trends of many stocks.
- Addressing these challenges and reversing the trend requires more and better data - funding for assessments has been mostly flat during this period.

OAR

- The U.S. Exclusive Economic Zone (EZZ) mapping and characterizations are contingent upon being able to sail via NOAA fleet, University-National Oceanographic Laboratory System, or Ocean Exploration Trust.
- All research cruises were canceled in FY 2020 Q3 due to COVID 19 related impacts and this was much the same for FY 2020 Q4.

OMAO

- **Ship Acquisition Milestones:**
  - NOAA is funded for the acquisition of a General-Purpose Oceanographic Ship under the Fleet Recapitalization program. While the FY18-19 period showed all major milestones met, one of two major acquisition milestones planned for FY20 was delayed. Specifically, completion of Preliminary Design by competing contractors was met, while the Detail and Design & Construction (DD&C) award was delayed by extensive source selection evaluations. In early FY21, the DD&C was awarded to one contractor.
- **Aircraft Acquisition Milestones:**
  - The Aircraft Recapitalization program is currently conducting two aircraft acquisitions projects, a King Air 350 and a Gulfstream G550. The FY 2019 aircraft acquisition milestones/targets were met. One FY20 milestone (award of the G550 aircraft design effort) was met in FY20 and the other FY20 milestone (delivery of the modified King Air) was completed in the first quarter of FY21, delayed due to COVID. In FY21, the award of the G550 aircraft physical modification was accomplished on schedule, and final calibration and operational certification of the modified King Air is expected to be met in mid FY21.

- **Ship Days-At-Sea (DAS):**
    - With all ships aging, the DAS trend from FY15 to FY19 showed a constant execution rate around 84-85%. This percentage reflects ships nearing their end of service life and the occurrence of unscheduled repairs. In addition, the government FY19 shutdown required a revised Fleet Allocation Plan (FAP) producing an 85% DAS level of execution under the new DAS baseline.
    - The recent FY20 COVID-19 threat generated another operational disruption. On March 18, 2020 ships were recalled to homeports after identifying COVID-19 safety concerns. With the impact of COVID-19, the fleet was forced to significantly reduce planned operational missions. After ship and crew assessments, NOAA reconstituted the fleet, and prioritized/rescheduled FY20 ship missions within the remaining few months. In FY21, COVID-19 protocols continue to be followed, while the NOAA Fleet Council implements its approval process for mission allocations/plans, just as it did in FY20.

NOS

- Volunteering and public engagement with the National Marine Sanctuaries: As COVID-19 resulted in the closure of visitor centers and the cancellation of volunteer, in-person, and outreach activities, the targets for two metrics from the National Marine Sanctuary Program were decreased for FY 2021.
- The FY2020 national targets for volunteering and public engagement with the National Marine Sanctuaries were not met due to impacts from COVID-19 restrictions. The restrictions resulted in the closure of visitor centers and the cancellation of volunteer, in-person, and outreach activities.

NWS

- The FY 2020 (similar to previous years) national targets for lead time and probability-of-detection of tornadoes were not met due to the high number of low-end intensity tornadoes (EF0-1) which have limited predictability due to their small size and short duration. However, the lead time and probability-of-detection for strong tornadoes (EF2-5) greatly exceed their targets.
- As in previous years, the probability-of-detection for winter storms was slightly short of the goal, with no apparent cause.
- Also, the probability-of-detection for geomagnetic storms in the space weather program dipped below the target goal for the first time in several years due to a slightly under-forecasted solar storm in September.

NESDIS

- OSC met all but one S.O. 1.1 targets for FY 2020.

<u>Explanation of Targets for FY 21 and FY 22</u>

Many of our targets are based on requested funding, therefore targets anticipate incremental improvement achieved through organizational learning.

NMFS:

- NMFS targets for FY21 mostly aspire to maintain current performance levels in the face of growing costs and other challenges, including the COVID-19 pandemic. FY21 targets will not be greatly affected by FY21 funding levels as there is a 1-3 year delay between resource allocation and performance improvement due to the nature of fisheries and protected species management, and results-based performance measures. FY21 funding will affect results in FY 22 through FY 24 and beyond.
- Targets for adequate assessments of fish stocks and protected species assume a certain number of days-at-sea. The Fleet Allocation Plan is approved by the NOAA Fleet Council based on numerous considerations such as customer scientific requirements, priorities, funding and available ships to perform specific missions. If anticipated funding is not appropriated or assets become unavailable, the NOAA Fleet Council will approve a revised Fleet Allocation Plan, which could affect targets and the ability to achieve them.
- Targets do not anticipate a drop in the number of fish stocks and protected species with adequate assessments despite a loss of 78% of NMFS days at sea in FY20. This is because many assessments can still be performed with other data from less reliable sources; the primary effect will be on the certainty of these assessments and the confidence in their results.
- Targets for permit processing efficiency should not be interpreted as targeting a decrease in efficiency, but as a minimum level NMFS seeks to ensure.

OAR

- The NOAA Science Council set the publications annual and quarterly targets as an average of the previous three years of actual data. The FY21-25 targets have been decreased to be an average of the FY17-19 actuals.

NOS

- Targets for two metrics from the National Marine Sanctuary Program were decreased in FY 2021 and FY 2022 due to **COVID-19** impacts: 1) Number of youth learning about national marine sanctuaries in hands-on or distance learning and the 2) Number of volunteer hours supporting science, education, and public engagement programs to raise awareness and meet science needs of national marine sanctuaries.

NWS

- Targets for the number of StormReady communities were reduced to 40 new communities in FY 2021, from 100, due to ongoing COVID-19. Targets for both StormReady and TsunamiReady communities for FY 2022 are yet to be determined because of uncertainties due to COVID-19 impacts.

OMAO

- Ship Days-at-Sea (DAS): As maintenance funds are used to address deferred and preventive maintenance, NOAA vessels will be more mission ready, and therefore, able to execute DAS at a higher level. The FY22 DAS target also assumes that the number of DAS lost due to unscheduled maintenance will be reduced, increasing the utilization rate of the entire NOAA ship fleet. Furthermore, the ship Fleet Allocation Plan for each FY is approved by the NOAA Fleet Council based on numerous

considerations such as customer scientific requirements, priorities, funding, COVID-19 procedures, and available ships to perform specific missions. If anticipated funding is not appropriated or assets become unavailable, the Fleet Council can approve a revised Fleet Allocation Plan with less DAS planned.

- Milestones (Aircraft and Ship Acquisitions): The aircraft and ship acquisitions are mission critical programs designated by DOC and NOAA for special in-depth management reviews where evidence of progress is provided against planned targets/milestones. Each aircraft and ship acquisition has a customized milestone schedule for assessing readiness to enter the next program/project phase.
- Pier Romeo Recapitalization Project: In FY22, NOAA will continue the FY21 work on the Charleston, South Carolina, NOAA/OMAO pier ROMEO recapitalization project. The pier is located in a critical southeast location for NOAA ships, however, the facility condition requires demolition and reconstruction. Site improvements will include integrating the new pier construction to support NOAA ships *Nancy Foster* and *Ronald H. Brown*, and other visiting vessels into the available space.
- Naval Station (NAVSTA) Newport, Rhode Island OMAO Ship and Support Facility Consolidation: NOAA will continue the FY21 start of consolidation activities for the NAVSTA Newport, RI location. Currently NOAA has two ships homeported at NAVSTA, the *Henry B. Bigelow* and *Okeanos Explorer*. In order to remain in compliance with the CENOTE Act, NOAA is required to co-locate with the NAVY whenever possible to increase technological sharing capabilities. This consolidation also aligns with NOAA's regional facilities plans.

NESDIS

- OSC plans to meet the S.O. 1.1 target for FY 2021. The office will continue to expand Space Commerce engagements through relationships with other bureaus and agencies.

<u>Progression of the Performance Indicators</u>

The performance indicators are reviewed throughout the fiscal year by NOAA leadership, and include quarterly NOAA Level Annual Operating Plan (AOP) updates, as well as the Mid-Year and End-of-Year Performance Reviews.

NMFS

- Change in the reporting of protected species assessments - The reporting of protected species stock assessments has been switched from percentages to raw numbers. NOAA has always targeted progress on protected species assessments by raw numbers; percentages were reported for informational purposes to provide a context for the numbers. That context will now be provided elsewhere.
- Change in the reporting of recovery actions - The reporting of recovery actions for protected species has been switched from percentages to raw numbers. NOAA has always targeted progress on protected species recovery actions by raw numbers; percentages were reported for informational purposes to provide a context for the numbers. That context will now be provided elsewhere.

OAR

- Annual number of peer-reviewed publications - There is a lag in indexing publications, so some articles published will not appear until a refreshed actual is produced during the subsequent quarter. The NOAA Science Council set the publications annual and quarterly targets as an average of the previous three years of actual data. The FY20-24 targets have been decreased to be an average of the FY17-19 actuals. In the future, the FY 2021 targets and subsequent years will be updated based on the actuals.

OMAO

- Acquisitions (Ships and Aircraft): In accordance with the DOC Scalable Acquisition framework, major milestones are performance indicators for these high-profile ship and aircraft acquisition programs that must be reviewed and approved by the DOC Deputy Secretary as the Department's Milestone Decision Authority, as well as the DOC Office of Acquisition Management and Senior Procurement Executive, before moving to next project milestone phase activities. Each acquisition is customized to meet the uniqueness of the platform and requires the level of evidence necessary for well-informed program/project decision-making. If future improvements in program management techniques/methodology become accepted in the program management community, DOC/NOAA could consider inclusion into its management framework.
- Ship Days-At-Sea: NOAA ships used Total Funded DAS starting in FY20 for both planned and actual DAS, instead of the previous OMAO Base Funded only. Total DAS include OMAO base funded DAS, program funded DAS, and reimbursable funded DAS. This approach enables NOAA to expand its performance planning and tracking to encompass the full scope of asset management.
    - An internal NOAA ship DAS planning and reporting database (Ship Daily Activity Log System) assists leadership in asset management and performance analysis. The system's historical records are maintained and analyzed for performance evidence showing improvement opportunities.
- Pier ROMEO Recapitalization Project: New indicator with project milestones targets beginning in FY21. Too early for trending data; not available at this point in the project.
- Naval Station (NAVSTA) Newport, Rhode Island OMAO Ship and Support Facility Consolidation: New indicator in with milestones starting in FY21. Insufficient data available for trends at this point.

Performance Data Validation and Verification

NOAA has robust institutional performance management processes to track progress on each strategic objective. All NOAA Line Offices (LO) and Staff Offices (SO) develop Annual Operating Plans (AOPs) with performance measures and milestones that demonstrate progress on the DOC Strategic Plan Objectives. These NOAA AOPs set ambitious goals (i.e., measures and milestones with associated targets) to demonstrate clear progress in achieving programmatic and organizational priorities, including implementation of the DOC Strategic Plan.

NOAA conducts an Annual Performance Review to evaluate key performance indicators to ensure we can demonstrate compelling progress in support of strategic priorities. Based on the Annual Performance Review results, NOAA develops an Annual Action Plan to develop new measures and to improve the utility of monitoring and increasing results of existing measures.

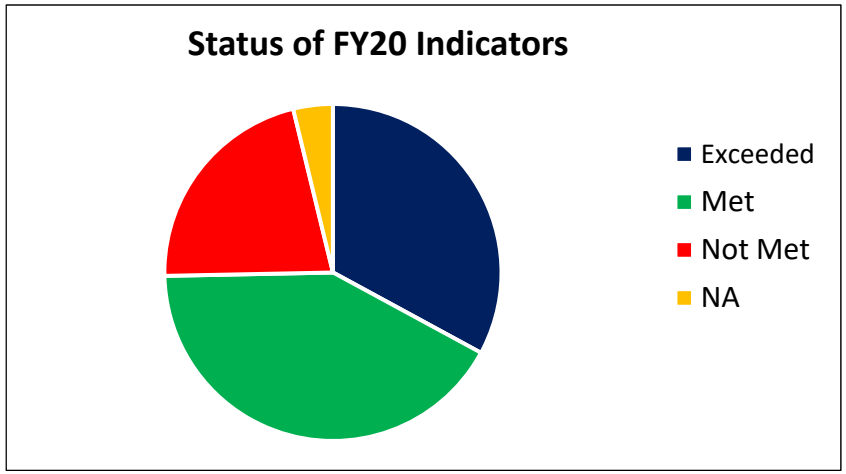
NOAA LO and SO's also;

- Ensure consistency and reliability of data used to measure progress by developing supporting documentation, or business rules, to record the process for setting targets and taking measurements for all reported measures.
- Track performance indicators and brief senior management on their progress each quarter.
- Routinely check data linked to the performance indicators for quality controlled for accuracy and reliability.
- The NMFS scientific enterprise ensures a sound scientific basis for NMFS's resource conservation and management decisions. They collect data and coordinate information and research to ensure science-based management and stewardship. They carry out at-sea resource surveys, stock assessments, fisheries observer programs, cooperative research, and socioeconomic research and data collection. All NMFS science products and programs are subject to independent peer review. There are many challenges involved in collecting and analyzing data on fish stocks and other marine species and their habitats that can result in both uncertainty and knowledge gaps, but management decisions and performance reporting are based on the best scientific information available.
- The NWS shares the data with NWS personnel, specific users via a Performance Management Web Portal, and the public.
- NWS Performance indicators are used to accelerate service improvement and set ambitious, yet achievable, goals to challenge the workforce and find new and creative ways to raise their level of performance to meet the more difficult targets. Not to mention, tracking performance reveals areas of service deficiency and potential areas of new technology or training investment. They are tracked and briefed to senior management of the NWS each quarter.
- NOAA Monthly Status Reviews ensure major satellite program acquisitions and projects stay within designed cost, schedule, and performance goals.
- OMAO Ship Days At Sea (Support Indicator): The ship DAS performance indicator is reviewed throughout the fiscal year by the Maine Operations Center and NOAA leadership, the latter including the quarterly NOAA Level AOP updates, as well as End-of-Year Performance Reviews. The under-lying performance drivers are discussed for increased understanding, research or opportunities for improved reporting/utilization.
- OMAO Acquisition Milestones (Aircraft and Ships): Once mission critical ship and aircraft acquisitions are identified by DOC/NOAA, each is structured to implement the Office of Acquisition Management scalable framework, containing key milestones. These acquisitions are required to report progress during special in-depth management reviews where evidence is provided against planned targets. Incomplete evidence may hold the program from moving to the next phase, and gaps in data require correction to the satisfaction of the oversight bodies.
- OMAO Facilities: (2 New Indicators): OMAO Pier ROMEO Recapitalization and Naval Station (NAVSTA) Newport, Rhode Island OMAO Ship and Support Facility Consolidation: Each facility related effort will start in FY21. Reliability of data for tracking progress requires supporting documentation with recorded processes and procedures to set targets and measuring

actuals for all reported metrics. Indicators will be briefed to senior managers throughout the year and reviewed by NOAA analysts.

- NESDIS tracks the achievement of its performance indicators on a quarterly basis through the NOAA Annual Operating Plan process.

Summary of NOAA Performance Indicators



Class	Strategic Objective	Performance Indicator	FY 2016 Actual	FY 2017 Actual	FY 2018 Actual	FY 2019 Actual	FY 2020 Actual	FY 2020 Target	FY 2021 Target	FY 2022 Target
Other / Revised	1.1	Number of space economy related assessments, governmental activities, events, and industry engagements on space-related activities				16	16	16	18	18

Discontinued	1.1	Milestones achieved in expanding capabilities (including staff) and transitioning SSA functions to DOC				10%	25%	25%	DISC	DISC
Discontinued	1.1	Number of workshops, reports, and other tools produced to facilitate growth and advancement of the U.S. commercial space industry	1	1	1	4	3	4	DISC	DISC
Discontinued	1.1	Number of external stakeholders engaged on space commerce policy issues				NA	400	400	DISC	DISC
Discontinued	1.1	Number of external stakeholder requests for support fulfilled				NA	40	40	DISC	DISC
Current / Recurring	2.1	Annual economic and societal benefits from Sea Grant activities as measured by jobs created/retained	20,770	7,100	11,764	7,600	10,000	10,000	7,500	7,500
Current / Recurring	2.1	Number of fishermen, seafood processors and aquaculture industry personnel who modify their practices using knowledge gained in fisheries sustainability and seafood safety	40,243	19,900	17,796	23,000	12,950	15,000	15,000	15,000

Current / Recurring	2.1	Annual economic and societal benefits from Sea Grant activities as measured by economic benefits of businesses				$523,000,000	$316,000,000	$450,000,000	$450,000,000	$450,000,000
Current / Recurring	2.1	Number of projects advanced that improve the efficiency and predictability of the federal aquaculture permitting process				16	26	21	31	29
Current / Recurring	2.1	Annual number of aquaculture research projects completed that address key production challenges				57	53	57	61	119
Current / Recurring	2.2	Average number of days to complete informal ESA Section 7 consultations				40	43	50	45	45
Other / Revised	2.3	Number of youth learning about national marine sanctuaries in hands-on or distance learning.				68,895	71,891	50,000	20,000	30,000
Discontinued	2.3	Number of natural resource environments managed by the Office of National Marine Sanctuaries in which water, habitat, and living resource quality is stable or improving				9	9	9	DISC	DISC

Current / Recurring	2.3	Percent of top 175 U.S. seaports with access to Physical Oceanographic Real-Time Systems (PORTS®) data (cumulative)	35%	37%	38%	43%	45%	44%	46%	47%
Current / Recurring	2.3	Fish Stock Sustainability Index 3	754.0	756.6	757.5	758.5	788.5	777.0	791.0	802.5
Current / Recurring	2.3	Percent of stocks for which catch is below the specified Annual Catch Limit	90.7%	91.9%	90.2%	88.3%	89.3%	89.7%	90.3%	91.3%
Current / Recurring	2.3	Percentage of FSSI stocks with adequate population assessments and forecasts (3.0)	62.3%	63.3%	57.8%	56.8%	69.1%	69.1%	69.7%	69.7%
Current / Recurring	2.3	Number of protected species stocks with adequate population assessments and forecasts	82	83	87	96	99	115	126	127
Current / Recurring	2.3	Number of protected species designated as threatened, endangered or depleted with stable or increasing population levels	31	30	30	30	28	30	28	28
Current / Recurring	2.3	Number of actions ongoing or completed to recover endangered and threatened species	2,233	2,183	2,234	2,358	2,416	2,385	2,443	2,470

Current / Recurring	2.3	Number of environmental reviews that exceed regulatory or statutory deadlines				74	36	60	55	50
Current / Recurring	2.3	Number of volunteer hours supporting science, education, and public engagement programs to raise awareness and meet science needs of national marine sanctuaries				117,746	61,518	125,000	5,000*	10,000*
Current / Recurring	2.3	Sanctuary and Monument reporting areas that can adequately assess resource condition				82%	80%	82%	80%	80%
Proposed Discontinued	2.3	Sanctuary and Monument natural resources (water, habitat and biota) being maintained or improved				47%	46%	47%	47%	DISC
Proposed Discontinued	2.3	Sanctuary and Monument reporting areas providing resource services at an acceptable level				71%	59%	71%	60%	DISC
Current / Recurring	2.3	Percent of Seafood Import Monitoring Program import records that are compliant				64%	54%	80%	66%	68%

Proposed New	3.3	Percent of U.S. EEZ surveyed to an appropriate level of certainty to support safe navigation per the Adequate Hydrographic Health Index (AHHI)				NA	NA	NA	33.80%	34.70%
Proposed Discontinued	3.3	Hydrographic data acquired to support safe and efficient maritime commerce and for community resilience to storms and other coastal hazards	3,296	2,480	3,403	8,745	3408	2,279	2,319	2319
Other / Revised	3.3	Number of StormReady Communities (cumulative)	2,597	2,750	3,060	3,191	3,297	NA	NA	NA
Other / Revised	3.3	Number of TsunamiReady Communities (cumulative)	199	203	210	216	216	NA	NA	NA
Current / Recurring	3.3	Annual number of peer-reviewed publications related to environmental understanding and prediction	1,697	1,678	1,794	3,171	3,366	3,563	3,410	3,410
Current / Recurring	3.3	Number of NOAA datasets made openly available via partners' cloud platforms to the public, America's Weather Enterprise and other environmental			40	84	132	100	170	200

		information stakeholders (Cumulative)								
Current / Recurring	3.3	U.S. Temperature forecasts skill	24	34	43	35	28	26	27	27
Current / Recurring	3.3	Key milestones completed on time for satellites deployments	3	2	2	2	2	2	2	2
Current / Recurring	3.3	Key milestones completed on time for ship deployments			2	1	1*	2	1	1
Current / Recurring	3.3	Aircraft Key Milestones completed on time for aircraft acquisitions				NA	1	2	2	1
Current / Recurring	3.3	Total Funded Days-At-Sea (DAS) for NOAA ships	2,414	2,554	2,352	1,719	917*	2,759	2,322	2,945
New /Recurring	3.3	OMAO Ship and Support Facility Consolidation Milestones					NA	NA	1	1
New/ Recurring	3.3	OMAO Pier Romeo Recapitalization Project Milestones					NA	NA	1	1
Current / Recurring	3.3	Percentage of data processed and delivered to operational users from NOAA-managed satellites	99.30%	99.49%	99.45%	99.40%	99.46%	98.50%	98.50%	98.50%
Current / Recurring	3.3	Severe weather warnings tornadoes - Storm based lead time	9	9	8	10	10	13	13	13

Current / Recurring	3.3	Severe weather warnings tornadoes - Storm based accuracy	61	58	57	64	63	72	72	72
Current / Recurring	3.3	Severe weather warnings tornadoes - Storm based false alarm ratio	69	72	69	70	68	71	71	71
Current / Recurring	3.3	Severe weather warnings for flash floods - Lead time	72	73	62	65	60	65	65	65
Current / Recurring	3.3	Severe weather warnings for flash floods - accuracy	80	77	78	77	79	76	76	76
Current / Recurring	3.3	Accuracy of Day 1 precipitation forecasts	36	34	36	37	36	34	34	34
Current / Recurring	3.3	Winter storm warnings - Lead time	21	22	18	21	24	20	20	20
Current / Recurring	3.3	Winter storm warnings - accuracy	85	87	80	82	81	90	90	90
Current / Recurring	3.3	Marine wind - Percentage of accurate forecasts	80	81	82	82	81	80	80	90
Current / Recurring	3.3	Marine wave heights - Percentage of accurate forecasts	85	84	85	85	84	83	83	83
Current / Recurring	3.3	Aviation ceiling/visibility forecast accuracy Instrument Flight Rules	63	63	63	64	64	65	65	65
Current / Recurring	3.3	Aviation ceiling/visibility forecast false alarm ratio Instrument Flight Rules	38	37	35	33	34	38	38	38
Current / Recurring	3.3	Geomagnetic storm forecast accuracy	68	65	60	62	55	58	59	60

Current / Recurring	3.3	Number of communities that utilize Digital Coast	5,043	7,040	6,903	6,678	6,608	5,000	5,000	5000
Current / Recurring	3.3	Percentage of U.S. coastal states and territories demonstrating annual improvement in resilience capacity to weather and climate hazards	74%	69%	74%	77%	83%	77%	50%	55%
Proposed Discontinued	3.3	Percent of all coastal communities susceptible to harmful algal blooms verifying use of accurate HAB forecasts	18%	23%	23%	23%	23%	23%	23%	DISC
Current / Recurring	3.3	Cumulative percent of U.S. and territories surveyed to improve vertical reference system for modernized height/elevation data	55.0%	64.0%	72.0%	79.0%	81.9%	87.0%	84.0%	88.5%
Current / Recurring	3.3	Annual number of OAR R&D products transitioned to a new stage(s)	65	65	66	65	104	125	80	80
Current / Recurring	3.3	Reduction in gap between high-performance computing deployed and what is needed to meet modeling requirements		13	16.4	17.8	18.9	18	20	23

Current / Recurring	3.3	Percentage of ingested environmental data safely archived to ensure consistent long-term stewardship and usability of the data	98%	98%	98%	98%	98%	98%	98%	98%
Current / Recurring	3.3	Annual number of NOAA partnerships with the private sector				14	8	16	13	16
Current / Recurring	3.3	Subseasonal temperature skill score				40	30	36	36	36
Current / Recurring	3.3	Global Ensemble Forecast System length of forecast considered accurate (CY)				9.8	9.95	10	10	36
Current / Recurring	3.3	Customer Satisfaction Index	82	82	85	86	86	80	80	80
Current / Recurring	3.3	Annual number of ocean acidification observations collected by the National Ocean Acidification Observing Network				7,211	11,037	7,300	7,665	7,665
Current / Recurring	3.3	Percent of deepwater ocean U.S. Exclusive Economic Zone mapped				51%	52%	51%	51%	53%
Current / Recurring	3.3	Annual number of sites characterized in the U.S. Exclusive Economic Zone				135	30*	100	100	100

Current / Recurring	3.3	Number of forecast and mission improvements, based on The Weather Research and Forecasting Innovation Act of 2017, to weather applications at operational U.S. weather services and in the U.S. weather commercial sector				12	8	5	12	10
Current / Recurring	3.3	Global Forecast System (GFS) 500 hPA Anomaly Correlation: Length of Forecast Considered Accurate		8.25	8.35	8.4	8.37	8.4	8.5	8.6
Current / Recurring	3.3	Percent Extended Range Climate Prediction Center Outlooks Exceeding Threshold: All Temperature/Precipitation Outlooks				78%	78%	78%	78%	78%
Current / Recurring	3.3	Percent Extended Range Climate Prediction Center Outlooks Exceeding Threshold: All Temperature Outlooks				81%	76%	80%	80%	80%
Current / Recurring	3.3	Percent Extended Range Climate Prediction Center Outlooks Exceeding Threshold: All Precipitation Outlooks				75%	75%	75%	75%	75%

Current / Recurring	3.3	Percent Long Range Climate Prediction Center Outlooks Exceeding Threshold: All Temperature/Precipitation Outlooks				50%	52%	48%	48%	48%
Current / Recurring	3.3	Percent Long Range Climate Prediction Center Outlooks Exceeding Threshold: All Temperature Outlooks				64%	67%	60%	60%	60%
Current / Recurring	3.3	Percent Long Range Climate Prediction Center Outlooks Exceeding Threshold: All Precipitation Outlooks				36%	36%	36%	36%	36%
Current / Recurring	3.3	Percent Extended and Long Range Climate Prediction Center Outlooks Exceeding Threshold: All Temperature/Precipitation Outlooks				76%	77%	75%	75%	75%
Current / Recurring	3.3	Percent Extended and Long Range Climate Prediction Center Outlooks Exceeding Threshold: All Temperature Outlooks				80%	76%	80%	80%	80%
Current / Recurring	3.3	Percent Extended and Long Range Climate Prediction Center Outlooks Exceeding				73%	78%	70%	70%	70%

		Threshold: All Precipitation Outlooks								
Current / Recurring	3.3	Hurricane Forecast track error (48 hour)	71	56	60	75	64.5	59	57	55
Current / Recurring	3.3	Hurricane Forecast intensity error (48 hour)	10	13	10	10	11.6	12	11	10
Current / Recurring	3.3	Annual number of ocean acidification observations transmitted to NOAA				71%	66%	70%	70%	70%

* FY20 Target missed due to COVID-19 or FY21/FY22 Targets with notable adjustments due to Covid-19 impacts.

	Exceeded		Met		Not Met