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FY2017

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**NOAA**

Budget Summary



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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## From the Desk of Dr. Sullivan



Dr. Kathryn D. Sullivan, Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator

Dear friends of NOAA,

As America's environmental intelligence agency, NOAA provides timely, reliable, and actionable information - based on sound science - to communities and businesses around the country every day. We've seen demand for our products and services increase, as decision makers look for tools to help them better understand risk and prepare for the future. We're helping people, businesses, communities, and governments make smart decisions that directly impact the future of society, the economy, and the environment.

Since announcing NOAA's priorities, the agency has made tremendous strides toward providing the information and services communities need to build resilience, evolving the National Weather Service, investing in our network of observational platforms, and, achieving organizational excellence.

### Providing Information and Services to Make Communities More Resilient

Communities around the country are struggling with the effects of extreme events like hurricanes, drought, and fisheries collapse. The drought in California - the worst in the state's history - is a paramount example of the environmental and socio-economic devastation that environmental events can wreak on communities, businesses, and the environment. NOAA's FY 2017 budget request takes a major step toward helping communities prepare for, respond to, and recover from the damage that weather-, water-, and climate-related events can cause.

As the only Federal agency charged with water prediction and warning responsibilities, NOAA is uniquely positioned to address water challenges facing the nation. Through targeted investments and an integrated approach to these challenges, NOAA will develop and deliver new and improved products that put critical water forecast information into the hands of local decision makers and the public, including integrated river and stream forecasts for more than 100 million Americans who don't currently receive this information.

The budget request also includes funding for grants to communities to enable them to implement resilience strategies, increased capacity to speed the completion of environmental consultations and remove obstacles to sustainable development, and investments in the baseline scientific research and observations needed to improve understanding and use of ocean and coastal resources and development of coastal infrastructure, all of which will be coordinated efficiently with the efforts of our Federal and state partners. These investments will support our efforts to build resilient communities, economies, businesses, and ecologies.

### Evolving NOAA's National Weather Service

NOAA has made considerable progress in evolving the National Weather Service over the past few years. From technical to organizational changes, including supercomputing upgrades and more efficient budget and administrative structures, we have made positive changes internally and externally. The proposed FY 2017 budget continues these efforts and aims to strengthen the products and services that promote public safety and protect livelihoods. The requested budget enables

NOAA to extend the life of the Next Generation Weather Radar (NEXRAD) infrastructure, which underpins forecast and warning services for severe high-impact weather events, such as tornadoes and thunderstorms. In addition, the budget invests in extending the life of the Automated Surface Observation System (ASOS), the nation's primary surface weather observing system. These upgrades, along with continued integration of NOAA dissemination systems, and expansion of our water prediction capabilities, are vital to ensuring that the NWS becomes second to none and we build a Weather-Ready Nation.

### Investing in Observational Infrastructure

NOAA's observing systems are the foundation of the environmental intelligence we provide. The successful launches of DSCOVR and Jason-3 satellites, and the upcoming launch of GOES-R are major milestones to assuring the continuity of our critical space-based data streams. Ongoing investments in radars, supercomputers, buoys, and other platforms are also critical to sustaining the nation's security against natural hazards, protecting our environment, and providing the information communities and businesses rely upon. The requested FY 2017 budget supports the Polar Follow On (PFO), a program that is vital to ensure the continuity of polar satellite observing systems, which provide the primary data inputs for NOAA's numerical weather prediction models.

NOAA's fleet of research vessels are aging, with half slated to retire within the next decade, including five Regional Class Survey Vessels (RSVs) that are essential to NOAA's fisheries and coastal missions. To prevent this significant erosion of mission capability, this budget invests in development of a new RSV to support fishery surveys, habitat and hydrographic surveys, and disaster response. The long timelines involved in shipbuilding make it imperative to invest in RSV replacement now, in order to avert a decline in stock assessment capacity that would result in more conservative fishery management decisions and lost fishing opportunities.

### Achieving Organizational Excellence

NOAA's employees are the lifeblood of the agency. Twenty-four hours a day, seven days a week, the dedicated men and women of this agency strive to provide excellent science and service to every community in the United States. As public servants, we fully embrace the mantra of "Mission First, People Always." At NOAA, we work hard to uphold a workplace that is welcoming, safe, and professionally challenging. In November 2015, I issued a diversity and inclusion policy statement to articulate how each and every member of our team can contribute toward building a workplace that enhances our people-based skills in concert with the skills we need as a science-based services agency.

Meeting NOAA's mission requires that our dedicated employees have safe and efficient workplaces and up-to-date equipment, technology, and tools that are equal to their mandated tasks. This budget makes targeted investments to remedy critical facility and IT deficiencies that put mission success at risk. Additionally, it proposes to fund a new program designed to accelerate the transition of promising NOAA research into operations and applications--ensuring that the public reaps the benefit of Federal investments in research and development.

### Conclusion

In closing, NOAA's FY 2017 budget supports our unique role within the Federal government. The requested funding is critical as the agency positions itself to meet the growing demand from communities and businesses to help them prepare for, respond to, and overcome vulnerabilities and risk.



Dr. Kathryn Sullivan

Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator

# Terminology

The reader should be aware of the specific meaning of several terms as they are used throughout this budget summary:

### FY 2015 Spend Plan

Fiscal Year (FY) 2015 Consolidated and Further Continuing Appropriations Act, 2015 (PL 113-235).

### FY 2016 Enacted

Fiscal Year (FY) 2016 Consolidated Appropriations Act, 2016 (PL 114-113).

### Adjustments-to-Base

Includes the estimated FY 2017 federal civilian pay raise of 1.6 percent (and the estimated FY 2017 federal military pay raise of 1.6 percent as appropriate). Program totals will provide inflationary increases for non-labor activities, including service contracts, utilities, field office

lease payments, and rent charges from GSA. In addition, ATBs include unique/technical adjustments to the base program, for example transfers of base resources between budget lines.

### FY 2017 Base

FY 2016 Enacted plus Adjustments-To-Base.

### Program Change

Requested increase or decrease over the FY 2017 base.

### FY 2017 Request

FY 2017 Base plus Program Changes.

# CHAPTER 1 INTRODUCTION



DSCOVR, the United States' first operational deep space satellite and a vital piece of our international space weather observing system, successfully launched on February 11, 2015 from Cape Canaveral, Florida.

**I**n its Fiscal Year (FY) 2017 budget request, NOAA continues to position itself as the Nation's premier environmental intelligence agency, supporting U.S. economic growth and job creation, enhancing public safety, and protecting and managing natural resources. NOAA's FY 2017 budget request includes \$5,851 million (\$77 million above the FY 2016 enacted level) to continue targeted investments to: 1) Provide information and services to make communities more resilient; 2) Evolve the National Weather Service (NWS); 3) Invest in observational infrastructure; and 4) Achieve organizational excellence. This budget aligns with the Department of Commerce's Environment, Data, and Operational Excellence priorities, as well as the Administration's priorities related to climate, Earth observations, IT security and high performance computing, ocean conservation and use, and research and development.

Of particular note, NOAA's FY 2017 budget includes a new Integrated Water Prediction initiative to enhance water prediction and public forecasting and warning capabilities to help communities better prepare for and respond to droughts and floods, both of which have grown in frequency and intensity in recent years. The budget also establishes a Research Transition Acceleration Program to accelerate promising NOAA research to operations, applications, and commercialization. In addition, this budget continues critical investments in NOAA's at-sea and space-based observation and monitoring capabilities through continued investments in the NOAA ship fleet and the Polar Follow On, a next generation polar satellite program critical for ensuring future forecasting accuracy and improving forecasting lead times, both of which save lives. For more information about specific FY 2017 initiatives, please consult the individual line office chapters that follow or the tables in Appendix 2.

NOAA appreciates the continued support of Congress, the Administration, and our broad and diverse base of stakeholders and will continue to monitor major milestones and accomplishments to evaluate progress and demonstrate success. Below are some of NOAA's top accomplishments from 2015, which we could not have achieved without our partners in other Federal and state agencies, as well as in the research, industry, and conservation communities:

## Launched Deep Space Climate Observatory Satellite (DSCOVR)

On February 11, 2015, NOAA successfully launched DSCOVR from Cape Canaveral, Florida. DSCOVR, the United States' first operational deep space satellite, is a vital piece of our international space weather observing system. DSCOVR provides NOAA's Space Weather Prediction Center forecasters high-quality measurements of solar wind conditions, improving their ability to monitor and warn of potentially dangerous geomagnetic storms. Early warnings are crucial because solar storms can disrupt public infrastructure, such as transportation systems, power grids, telecommunications, and Geographic Positioning Systems (GPS). Early geomagnetic storm warnings allow infrastructure managers from the commercial airline, electric power, and GPS industries to take appropriate mitigation actions. DSCOVR reached final orbit at Lagrange point 1, a gravity neutral point a million miles away from Earth, on June 8, 2015, and is now hovering continuously between the sun and Earth.

## Continued Progress on Ending Overfishing and Rebuilding Fish Stocks

NOAA's *Status of Stocks 2014: Annual Report to Congress on the Status of U.S. Fisheries*, released in April

2015, reports that the number of fish stocks subject to overfishing or overfished has declined to an all-time low. As a result of the combined efforts of NOAA; the regional fishery management councils; and our partners in industry, research, and conservation communities; stocks subject to overfishing are down from 17 to eight percent and overfished stocks are down from 24 to 16 percent since 2007. The report notes that three stocks, Gulf of Mexico gag grouper, golden tilefish, and butterfish, have been rebuilt to target levels. Two additional stocks, canary rockfish and petrale sole, have been rebuilt since the report was released, bringing the total to 39 stocks rebuilt since 2000 and allowing additional fishing opportunity in those fisheries. Gulf of Mexico red snapper continues to rebuild, enabling a 30 percent increase in the allowable catch for red snapper in 2015.

## Led Effort to Secure Settlement Funds for Gulf of Mexico Ecosystem Restoration

In FY 2015, NOAA led a collaborative effort among four Federal agencies and the five Gulf of Mexico states (Trustees) to advance the Deepwater Horizon oil spill case – the largest marine oil spill in U.S. history – to reach a groundbreaking proposed settlement between British Petroleum (BP) and the Trustees that will promote widespread restoration

in the affected region. NOAA provided extensive science and research (assessing the fish, wildlife, and habitat affected by the spill), supported the litigation actions against BP and other responsible parties, and led development of a comprehensive damage assessment and restoration plan that will direct \$8.8 billion for ecosystem restoration in the Gulf of Mexico in the coming years. This funding will support significant long-term restoration for natural resources injured by the oil spill, including sea turtles, marine mammals, fish, deep sea corals, oysters, and coastal habitats and will provide lasting and significant benefits to the people and environment of the Gulf of Mexico who were most directly impacted by this tragic event.

### Supported Major Recovery Efforts for Endangered Species Act (ESA)-listed Salmonids

NOAA played key roles in two major recovery efforts for ESA-listed Pacific salmon and steelhead in 2015. First, the threatened south-central California Coast steelhead now has unimpeded access to an additional 25 miles of spawning and rearing habitat due to efforts of NOAA, California State Coastal Conservancy, California American Water, and other partners that resulted in removal of the 106-ft. San Clemente Dam on the Carmel River in Monterey, California. Second, for the first time since the 1950s, threatened Central Valley spring-run Chinook salmon began their lives in the waters of the San Joaquin River due to a re-introduction effort led by the San Joaquin River Restoration Program (SJRRP), a multi-agency state and Federal partnership that includes NOAA. This effort allowed for release of approximately 60,000 hatchery-produced juvenile spring-run Chinook into the San Joaquin River in February 2015. Before operation of the Friant Dam in the 1950s, tens to hundreds of thousands of spring-run Chinook salmon returned to the San Joaquin River in California. The SJRRP is using a balanced approach that enables species recovery while maintaining a reliable water supply, critical to California's agriculture industry.

### Increased Supercomputing Capacity for Improved Data Assimilation and Forecasts

In FY 2015, NOAA began a major upgrade of its large scale operational supercomputers to allow for greater data assimilation and faster computation of model data, which will create more realistic conditions in NOAA models and enable more accurate weather forecasts and enhanced public safety. The supercomputing upgrade will help forecasters more accurately predict droughts, floods, winter storms, severe thunderstorms, and hurricanes. It will also enhance NOAA's water science and services for better forecasts of water

flow, soil moisture, evapotranspiration, runoff, and other parameters for 2.7 million stream reaches in the continental U.S. This upgrade has already increased NOAA's supercomputing capacity by nearly four times the previous level, for a total of 5.8 petaflops.

### Expanded Two California National Marine Sanctuaries

On June 9, 2015, NOAA expanded two national marine sanctuaries (NMS) by 2,770 square miles to protect one of the most productive ocean areas in North America. The nutrient rich upwelling zone identified in the Cordell Bank and Gulf of the Farallones NMS supports a vast array of sea life including whales, seals, dolphins, sea lions, and white sharks. New research opportunities in the expansion areas have already provided new findings, including the discovery of large catshark and skate nursery areas and a new species of gorgonian coral. Cordell Bank NMS, located 42 miles north of San Francisco, was expanded from 529 square miles to 1,286 square miles. Gulf of the Farallones NMS (now called the "Greater Farrallones NMS"), located in the waters adjoining Cordell Bank NMS, was expanded from 1,282 square miles to 3,295 square miles of ocean and coastal waters. The expansions followed extensive public comment and research by NOAA and its scientific partners.

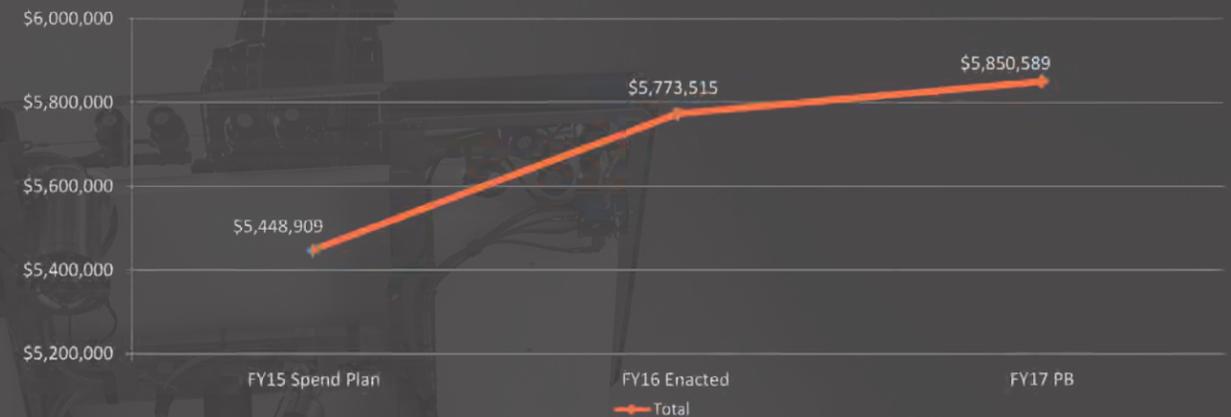
### Released Climate Resilience Toolkit

In October 2014, NOAA released version 1.0 of the web-based U.S. Climate Resilience Toolkit, which helps the Nation address challenges related to coastal flooding and other climate-related risks. For instance, the Toolkit includes map generators to illustrate climate-related vulnerabilities that communities face on national and local scales, and summarizes steps communities can take to become more resilient to climate change, such as managing water supply or strengthening infrastructure. The Climate Resilience Toolkit was developed in accordance with the President's Climate Action Plan and is available online at <https://toolkit.climate.gov>.

### Transitioned the Multi-Radar Multi-Sensor System to Operations

In October 2014, in collaboration with University of Oklahoma's Cooperative Institute for Mesoscale Meteorological Studies, NOAA transitioned into operations its Multi-Radar Multi-Sensor (MRMS) system, which helps forecasters manage the high volume of available weather data. The MRMS system generates products every two minutes, streamlining large amounts of data from multiple sources to provide more accurate and complete weather trends than traditional, single-radar

NOAA Discretionary Appropriation Budget Trends (FY 2015-2017)  
(\$ thousands)



systems. With MRMS forecasters are better able to visualize high-impact weather events such as snowstorms and tornadoes. This, in turn, allows NOAA to provide earlier and more accurate weather forecasts.

### Completed Hydrographic and Environmental Surveys in the Arctic

During 2015, NOAA ships collected critical hydrographic, fisheries, and protected species data in the Arctic region, enabling improvements to nautical charts required for safe navigation and providing data on managed species. NOAA Ships Rainier and Fairweather collected nearly 600 nautical miles of hydrographic data. NOAA ships Ronald H. Brown and Oscar Dyson supported a joint NOAA fisheries and research project to study marine ecosystems in the Northern Bering Sea, Chukchi Sea, Beaufort Sea, and Gulf of Alaska. The NOAA ship Reuben Lasker conducted a month-long North Pacific right whale survey off Kodiak Island, AK; this data is critical to assessment and management of this endangered species.

### Upgraded Hurricane Weather Research and Forecasting Model

On June 9, 2015, NOAA improved operational hurricane track and intensity forecasts for the first time for the Western North Pacific, Southern Pacific, and North and South Indian oceans. The Hurricane Weather Research and Forecasting (HWRF) model, which tracks the entire globe to detect tropical cyclones, was upgraded and can now produce forecast guidance out to five days in advance for up to seven separate storms simultaneously. Evaluation of the 2015 HWRF model for the North Atlantic, Eastern North Pacific and Western North Pacific showed a ten percent improvement compared to the model's performance in 2014.

### Issued Volcanic Ash Advisories

On July 31, 2015, using imagery from its Suomi NPP satellite system, NOAA's Washington Volcanic Advisory Center (W-VAAC) helped predict the movement of volcanic ash from the eruption of Manam Volcano off the coast of Papua New Guinea. The Federal Aviation Administration and commercial airlines rely on W-VAAC information to determine if they need to reroute or delay air traffic to avoid volcanic ash, which spreads quickly and can stop airline engines mid-flight. W-VAAC is responsible for monitoring the continental United States, Hawaii, a large part of the Pacific, Central America, northern South America, the Caribbean, and the western Atlantic for volcanic activity. In FY 2015, W-VAAC issued roughly 1,777 volcanic ash advisories to warn about the serious threat of volcanic ash. W-VAAC also provides 6-, 12-, and 18-hour satellite tracking that shows the location and likely dispersal of volcanic ash plumes.

### Released Upgraded nowCOAST Tool

NOAA released a major upgrade of nowCOAST in September 2015. The GIS web-based mapping portal provides near real-time coastal intelligence for coastal and marine users on present and future weather, oceanographic, and hydrologic conditions. The new version features an improved map viewer that enables animations of changing conditions and the use of different base maps. The tool now integrates the latest National Weather Service watches, warnings, and advisories for long-duration hazards; water vapor imagery from NOAA geostationary satellites (GOES); forecast guidance from NOAA operational oceanographic forecast modeling systems; and satellite data on lightning activity. This improved functionality better serves needs of users involved in emergency management, homeland security, search and rescue, and marine operations.

# CHAPTER 2 NATIONAL OCEAN SERVICE

**NOAA's** National Ocean Service (NOS) enables safe, sustainable, and efficient use of marine and coastal resources. NOS monitors physical oceanographic features and provides oceanographic data to the public; conducts research for sustainable management, protection, and restoration of ocean and coastal resources; and uses place-based approaches to achieve sound resource management. NOS's science-based products and services support increased coastal economic activity, resilient coastal communities, safe and efficient marine transportation, and enhanced ecosystem services.

## FY 2017 REQUEST \$569,915,000

NOAA requests a total of \$569,915,000 in discretionary and mandatory funds to support enhanced operations and stakeholder support capabilities within NOS. This total includes Operations, Research, and Facilities (ORF); Procurement, Acquisition, and Construction (PAC); and other accounts and includes a net increase of \$33,152,000 in FY 2017 program changes. Funding in 2017 will allow NOS to continue to make critical investments in products, services, and capabilities that strengthen the resilience of the Nation's coasts and coastal communities to immediate hazards and long-term risks.

## FY 2017 ORF BUDGET SUMMARY

NOAA requests a total of \$528,411,000 to support the Operations, Research, and Facilities of the NOS. This includes a net increase of \$23,152,000 in program changes.

### ORF PROGRAM CHANGE HIGHLIGHTS FOR FY 2017:

Program changes above \$1,000,000 are highlighted below. A summary of funding by Program, Project, and Activity (PPA) is located in Appendix 2. Detailed descriptions of all program changes by PPA are located in the NOAA FY 2017 Congressional Justification.

### NAVIGATION, OBSERVATIONS, AND POSITIONING \$197,906,000

NOAA requests a net program decrease of \$10,000,000 for a total of \$197,906,000 in the Navigation, Observations, and Positioning sub-program. Highlights include:



This PORTS<sup>®</sup> station will provide real-time, 24-hour water level information to mariners, providing safe transport in and out of Port Fourchon, Louisiana.



Two NOAA divers cut a large piece of derelict fishing gear into pieces at the surface.

**Navigation, Observations and Positioning: Hydrographic Research and Technology Development:** NOAA requests a decrease of \$2,000,000 to discontinue single-year cooperative agreements with academic institutions for joint ocean and coastal mapping centers. NOAA will continue to support research and development of survey, geospatial data management, and cartographic technologies through the Joint Hydrographic Center, the Coast Survey Development Laboratory, and other Navigation, Observations, and Positioning programs.

Unique geologic formations along the coast provide different textures and habitats for wildlife.  
Credit: Matt McIntosh/NOAA.

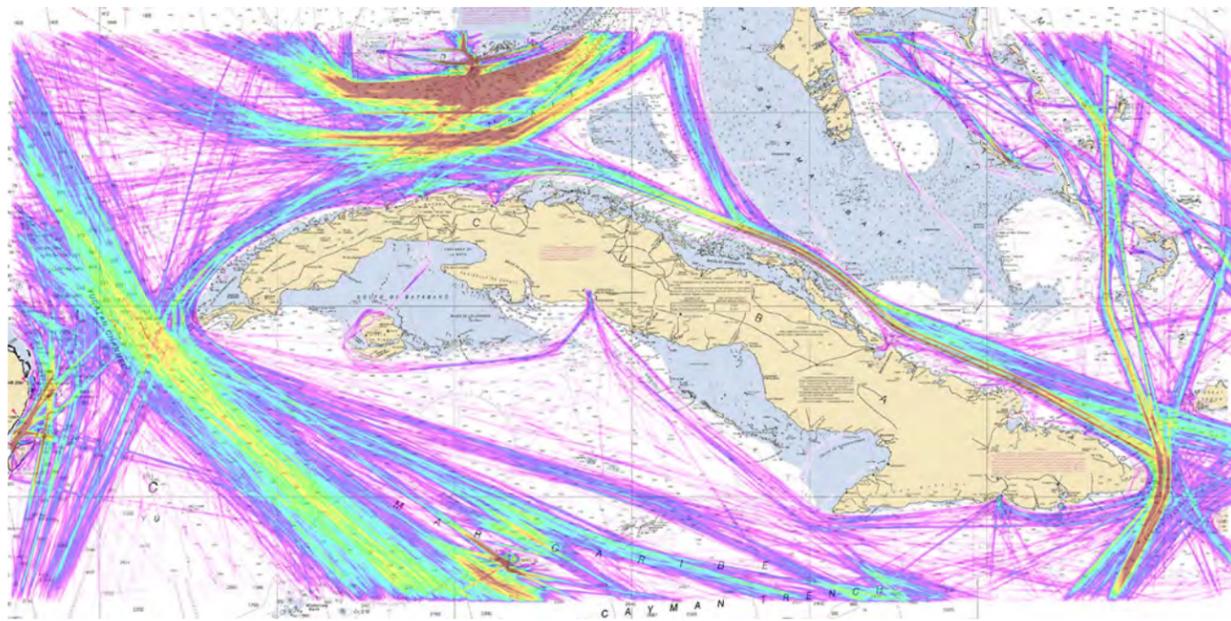


Chart of FL Straits with Automated Identification System (ship traffic) data overlaid that shows the high traffic density in the Straits.

**Navigation, Observations and Positioning: Regional Geospatial Modeling Grants:** NOAA requests a decrease of \$6,000,000 to terminate the Regional Geospatial Modeling Grant program. NOAA will continue to support a range of regional geospatial requirements through NOS's Coastal Zone Management and Services, and Navigation, Observations, and Positioning program activities. These regionally significant activities include height modernization, Continuously Operating Reference Stations, data access, and capacity building.

**Hydrographic Survey Priorities/Contracts: Reduce Acquisition of Hydrographic Surveys Data:** NOAA requests a decrease of \$2,000,000 to reduce acquisition of hydrographic data from contract surveys. NOAA will continue to acquire hydrographic data in support of navigation and other coastal intelligence needs with remaining funds.

**COASTAL SCIENCE AND ASSESSMENT \$87,112,000**

NOAA requests a net program increase of \$4,000,000 for a total of \$87,112,000 in the Coastal Science and Assessment sub-program. Highlights include:

**Competitive Research:** NOAA requests an increase of \$4,000,000 to expand competitive research grants that address coastal ocean issues, including harmful algal blooms, hypoxia, and coastal ecosystem assessment.

**OCEAN AND COASTAL MANAGEMENT AND SERVICES \$243,393,000**

NOAA requests a net program increase of \$29,152,000 for a total of \$243,393,000 in the Ocean and Coastal Management and Services sub-program. Highlights include:

**Coastal Zone Management and Services: Integrated Water Prediction:** NOAA requests an increase of \$2,500,000 to develop and operate the Nation's first Integrated Water Prediction (IWP) capability by developing key atmospheric, terrestrial, and coastal water prediction capabilities across NOAA. IWP will deliver water intelligence products and services to local stakeholders, such as emergency managers and state and municipal officials. Products will include unified, consistent, and



Scientists deploy an Environmental Sample Processor to detect toxic *Alexandrium* blooms in the Gulf of Maine.

high-resolution forecasts for floods and droughts. This cross-line office initiative with the National Weather Service (NWS) begins a multi-year strategy to improve water intelligence services provided to the Nation. NOS will lead the new service delivery model component of the IWP program, bringing together interdisciplinary practitioners to establish common data standards, baseline knowledge, and protocols so that products meet stakeholder needs. For more information on this joint initiative between NOS and NWS, please see p. 27 and p. 29 in Chapter 5.

**Coastal Zone Management and Services: Ecosystem-based Solutions for Coastal Resilience:** NOAA requests an increase of \$5,000,000 for NOS in a joint initiative with the National Marine Fisheries Service (NMFS) to better inform decision-making related to the stewardship of inshore ecosystems. This initiative will complement the NMFS proposal "Ecosystem-based Solutions for Fisheries Management." Increases in coastal population densities and development are reducing the ability of marine and coastal habitat to support species populations and serve as natural barriers against environmental threats, such as severe storms. Agencies, businesses, and communities need additional habitat science to better inform decision-making and enable effective resource management, disaster recovery, and redevelopment planning. Each of these functions is essential to



A bicyclist navigates flooded path in Charleston's Battery.



A pipeline rupture allowed an estimated 21,000 gallons of crude oil to reach the Pacific Ocean, shown here where the oil entered Refugio State Beach in California. NOAA's Office of Response and Restoration provided information on the fate and effects of the crude oil and potential environmental impacts both in the water and on the shore.

support coastal economies. NOS will apply physical and social sciences to deliver actionable information to communities. This will allow green infrastructure and other ecosystem-based solutions to be incorporated into hazard mitigation, coastal development, and post-disaster rebuilding. For more information on this joint initiative between NOS and NMFS, please see p. 13 in Chapter 3.

**Coastal Zone Management and Services: Capacity to Respond to Extreme Events:** NOAA requests an increase of \$4,006,000 to build internal capacity to support community response and resilience to extreme events. This initiative includes continued improvements to inundation monitoring and modeling, social science and risk communication, decision support tools, place-based monitoring, and planning and training for resilient coastal development.

**Coastal Zone Management and Services: AmeriCorps' Resilience Corps Pilot Program Training and Technical Assistance:** NOAA requests an increase of \$2,000,000 to develop and administer a community resilience training and technical assistance program for the AmeriCorps' Resilience Corps Pilot Program. This investment will support communities and Tribes in developing vulnerability assessments, coordinating with Federal resilience efforts, and implementing resilience strategies.

**Coastal Management Grants: Regional Coastal Resilience Grants:** NOAA requests an increase of \$15,000,000 to expand this competitive grant program to more fully address community, ecosystem, fishing community, and economic resilience challenges across the U.S. This



program will assist coastal communities in planning for extreme weather events, coastal inundation, climate hazards, changing ocean conditions, and competing uses; supporting regional approaches that leverage existing collaborative efforts; and protecting, restoring, and enhancing coastal habitat, including fisheries. The solicitations for NOAA's resilience grants in 2015 yielded \$151,000,000 in requests, far exceeding the available funding and demonstrating the significant unmet need for resilience tools and project implementation nationwide.

## FY 2017 PAC BUDGET SUMMARY

NOAA requests a total of \$3,700,000 to support Procurement, Acquisition, and Construction (PAC) activities of the National Ocean Service, unchanged from the FY 2016 enacted level. These funds support the National Estuarine Research Reserve System (NERRS) Construction and Land Acquisition Program and the National Marine Sanctuaries Construction Program.

## DISCRETIONARY FUNDS

### National Oceans and Coastal Security Fund

NOAA requests an increase of \$10,000,000 to establish the National Oceans and Coastal Security Fund, as authorized by Title IX of the Consolidated Appropriations Act, 2016. This Fund will increase the capacity of coastal

states and other entities to conduct projects and initiatives to better understand and utilize the oceans, coasts, and Great Lakes of the United States, and ensure present and future generations will benefit from the full range of ecological, economic, social, and recreational opportunities, security, and services these resources are capable of providing. Broadly, grants will support protection, conservation, and restoration of ocean and coastal resources and coastal infrastructure.

## MANDATORY FUNDS

### Damage Assessment and Restoration Revolving Fund

The Damage Assessment and Restoration Revolving Fund was established in 1990 under Section 1012(a) of the Oil Pollution Act to facilitate (1) natural resources damage assessments and (2) restoration, replacement, or acquisition 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. The fund receives proceeds from claims against responsible parties as determined through court settlements or agreements.

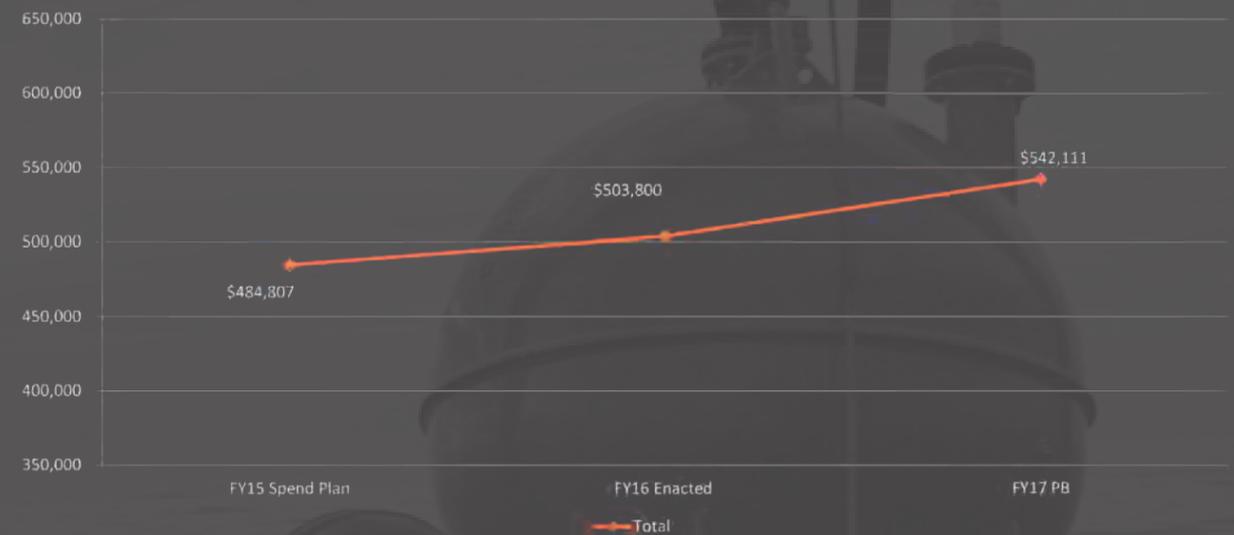
### Sanctuaries Enforcement Asset Forfeiture Fund

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



Taro Lo'i and the Ko'olau Mountains surrounding the the proposed NERR site in He'eia.

NOS Discretionary Budget Trends (FY 2015-2017)  
(\$ thousands)



sanctuary regulations. Penalties received are spent on resource protection within a sanctuary in which the violation occurred.

### Gulf Coast Ecosystem Restoration Science, Observation, Monitoring and Technology Fund

The Gulf Coast Ecosystem Restoration Science, Observation, Monitoring, and Technology Fund provides funding for the NOAA RESTORE Act. The purpose of this program is to initiate and sustain an integrative, holistic understanding of the Gulf of Mexico ecosystem and support restoration efforts and the long-term sustainability of the ecosystem.



# CHAPTER 3 NATIONAL MARINE FISHERIES SERVICE

Hawaiian monk seal swims in the Papahānaumokuākea Marine National Monument.

**NOAA's** National Marine Fisheries Service (NMFS) is responsible for the stewardship of the nation's living marine resources and their habitats. NMFS provides vital services for the Nation, including sustainable and safe sources of seafood; the recovery and conservation of at-risk species; and healthy, resilient ecosystems – all backed by sound science and an ecosystem-based approach to management. As of January 2016, NMFS manages 473 marine and anadromous fish stocks within the U.S. Exclusive Economic Zone (EEZ) as well as invertebrates, sea turtles, marine mammals, and other marine and coastal species and their habitats.

## FY 2017 REQUEST \$1,015,930,000

NOAA requests a total of \$1,015,930,000 in discretionary and mandatory funds to support the continued and enhanced operations of NMFS. This includes Operations, Research, and Facilities (ORF) and other accounts, including the Pacific Coastal Salmon Recovery Fund, and represents a net increase of \$51,786,000 in FY 2017 program changes. With this increase, NMFS will expand its permitting and consultation capacity to ensure commercial and other activities can move forward expeditiously in compliance with the Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), and Magnuson-Stevens Fishery Conservation and Management Act (MSA). NMFS will also be able to expand assistance to some fishing communities with future declared fishery disasters, and strengthen fishery management and enforcement programs, especially those related to illegal, unreported, and unregulated (IUU) fishing. NOAA also requests \$4,557,000 to prepare for the construction of a replacement laboratory in Mukilteo, Washington on Puget Sound. The lab, which is a near-term safety hazard and must be rebuilt, supports Washington State's Puget Sound recovery efforts and northwest commercial and recreational fisheries, which generate \$14.7 billion in sales and 167,000 jobs. NOAA requests these funds within the Mission Support Procurement, Acquisition, and Construction (PAC) account. For more information on the NOAA Fisheries Facilities Initiative, please see p. 42 in Chapter 7.



New England fishing vessels.

## FY 2017 ORF BUDGET SUMMARY

NOAA requests a total of \$904,734,000 to support the Operations, Research, and Facilities of NMFS, reflecting a net increase of \$42,786,000 in FY 2017 program changes.

### ORF PROGRAM CHANGE HIGHLIGHTS FOR FY 2017:

Program changes above \$1,000,000 are highlighted below. A summary of funding by Program, Project, and Activity (PPA) is located in Appendix 2. Detailed descriptions of all program changes by PPA are located in the NOAA FY 2017 Congressional Justification.

## PROTECTED RESOURCES SCIENCE AND MANAGEMENT \$216,771,000

NOAA requests a net increase of \$31,802,000 in FY 2017 program changes in the Protected Resources Science and Management sub-program for a total of \$216,771,000. Highlights include:

**Marine Mammals, Sea Turtles and Other Species: Increase Consultation Capacity, ESA Recovery:** NOAA requests an increase of \$13,452,000 to build ESA and MMPA consultation capacity, to address significant growing and emerging permitting needs (e.g., Gulf of Mexico restoration, road and bridge construction, drought projects) and reduce the con-

sultation backlog. With this increased capacity, NOAA will advance species recovery while enabling sustainable economic activity, both of which contribute to community resilience. NMFS will also use \$3,000,000 to advance recovery planning and implementation with partners for ESA listed corals. This request, along with the proposed increase below for essential fish habitat (EFH) consultations in the Habitat Conservation and Restoration sub-program (see p. 15), is part of a broad NOAA initiative to expand capacity needed to expedite review and permitting of public and private development projects that benefit the Nation's economy and create new jobs. NOAA will target some of this increase to support consultations related to Deepwater Horizon and RESTORE Act projects.

**Species Recovery Grants:** NOAA requests an increase of \$16,012,000 for the Species Recovery Grants program, which provides funding to states and Tribes to implement recovery actions for ESA listed species. Recovery actions (e.g., dam removal, bycatch reduction efforts, monitoring programs) improve species populations and habitat so that ESA protections are no longer necessary. Expanding this competitive grants program is critical for our partners to meet management needs for the growing number of listed species and focus on larger scale, ecosystem-level or multi-state projects that have a greater impact on the recovery of listed species. As of January 2016, NMFS had jurisdiction over 129 threatened or endangered species, with an additional 49 species proposed, candidates, or petitioned for listing. NMFS will prioritize funding for grants that address species in the "Species in the Spotlight: Survive to Thrive" initiative, which focuses internal and external resources on preventing the extinction of the most vulnerable species (e.g., white abalone, HI monk seals, southern resident killer whales, Gulf of Maine Atlantic salmon).



Southern Resident killer whales.



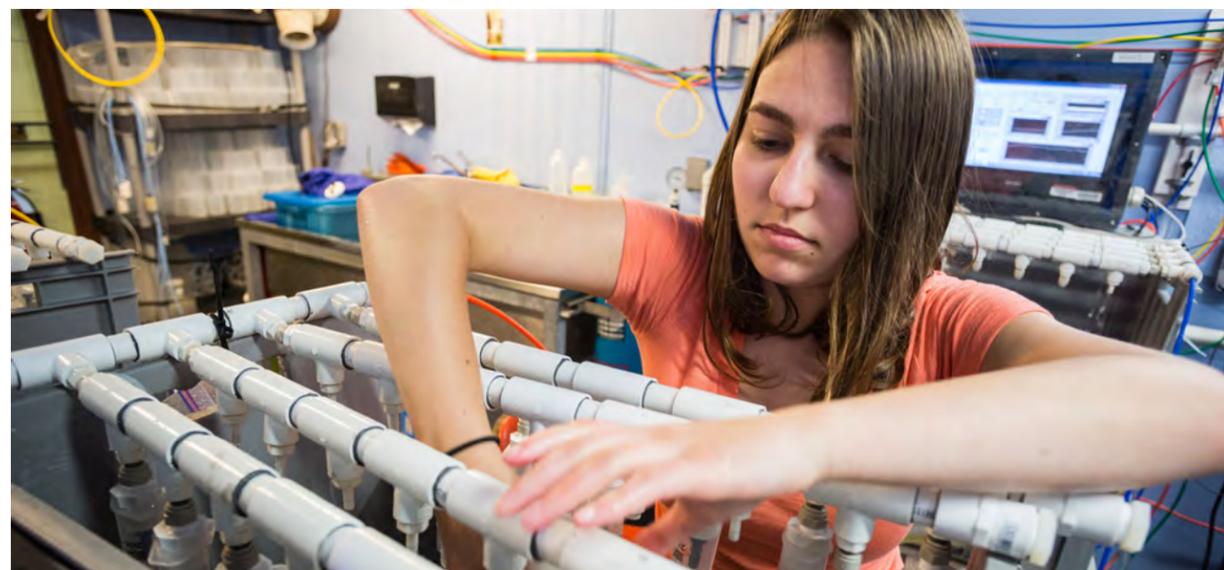
A pair of spawning pink salmon. Credit: John R. McMillan/NOAA.

**Pacific Salmon:** NOAA requests an increase of \$2,338,000 to implement recovery actions and expand consultation capacity to promote Pacific salmonid (salmon and steelhead) recovery. NMFS will focus FY 2017 funds on expediting review of hatchery genetic management plans and improving hatchery practices to reduce their impacts on ESA listed salmonids. Continued hatchery operations are essential to sustaining Pacific salmonid stocks, and hatcheries that are out of compliance are at risk of litigation and potential reduced production. In addition, NMFS will expand monitoring and data collection to enable more precise, targeted, and prioritized recovery strategies, and increased economic opportunity (e.g., harvest).

### FISHERIES SCIENCE AND MANAGEMENT \$558,715,000

NOAA requests a net increase of \$13,489,000 in FY 2017 program changes in the Fisheries Science and Management sub-program for a total of \$558,715,000. Highlights include:

**Fisheries and Ecosystem Science Programs and Services: Ecosystem-based Solutions for Fisheries Management:** NOAA requests an increase of \$5,929,000 for NMFS in a joint initiative with NOS to fill gaps in habitat science needed to improve fisheries and protected species management and community resilience. NMFS will map coastal ecosystems (e.g., marshes, dunes, mangroves) and advance understanding of the value of habitat to fish and protected species populations and as physical defense systems for coastal communities. Rapidly increasing coastal population densities and development are impacting habitat benefits, reducing their ability to support species populations or serve as natural barriers against severe storms and other environmental



The ocean acidification laboratory at the NOAA Mukilteo Research Station is a state-of-the-art facility with which researchers can study the sensitivity of California Current species to ocean acidification, temperature change, and deoxygenation. Here, Jennifer Imm, a NOAA Hollings Scholar, loads a vile containing young Dungeness crab into equipment that exposes them to altered pH and oxygen conditions. Credit: Benjamin Drummond /bdsjs.com.

threats. Additional, targeted, high-quality habitat science will better inform decision-making and trade-offs, enabling effective resource management, disaster recovery, and redevelopment planning, while supporting coastal economies. For more information on this joint initiative between NMFS and NOS, please see p. 8 in Chapter 2.

**Observers & Training:** NOAA requests an increase of \$1,095,000 for observers and training to provide accurate and timely information and analyses on the biological, economic, and social aspects of the Nation's fisheries resources. The scientific data collected by observer programs are critical to 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 requested funding will provide an additional 1,000 sea days of observer coverage in six regional fishery observer programs.

**Fisheries Management Programs and Services: National Catch Share Program:** NOAA requests an increase of \$2,505,000 to develop and implement new catch share programs and support existing programs. Implementation of a new catch share system involves many activities at both national and regional levels, including collecting and analyzing socioeconomic data, establishing accounting databases and reporting systems, and setting up at-sea and dockside monitoring systems. Catch share programs are an important management tool that have demonstrated benefits such as preventing

the dangers associated with the "race for fish," eliminating overfishing, and reducing bycatch. In some fisheries, catch share programs have resulted in more profitable fisheries. For example, the value of the Gulf of Mexico red snapper fishery more than doubled since a catch share program was instituted in 2007 – from \$10.1M in 2007 to \$23.0M in 2014.

**Fisheries Management Programs and Services: Management of Fair Trade:** NOAA requests an increase of \$1,556,000 to combat illegal, unreported, and unregulated (IUU) fishing and fraud by tracking seafood from global harvest to entry in the United States. IUU fishing weakens profitability for legally caught seafood, fuels illegal trafficking operations, and undermines economic opportunity for legitimate fishermen. Global losses attributable to IUU fishing are estimated to be \$10 to \$23 billion annually. Because the U.S. imports more than 90 percent of its seafood, NOAA is working to ensure that high demand for imported seafood does not create incentives for illegal fishing activity. Developing a seafood traceability program will help ensure that products are legally fished, properly labeled, and meet adequate safety and environmental standards. These efforts will create a more level playing field between foreign and U.S. fishermen and secure the Nation's and fishing communities' significant investments in the safety and sustainability of U.S. domestic fisheries. This initiative is complemented by a requested increase in the Enforcement sub-program, described below (see p. 15).



**Aquaculture: Support for Domestic Seafood Production and Jobs through Aquaculture:** NOAA requests an increase of \$1,525,000 to conduct research and regulatory activities that enable safe and sustainable aquaculture development. The U.S. currently imports over 90 percent of its seafood, over half of which is from aquaculture. This funding will be used to develop a coordinated, consistent, and efficient regulatory permitting process for the marine aquaculture sector and to refine science-based tools for sustainable management of marine aquaculture. The funding will increase the U.S.-sourced seafood supply and will create jobs and increase trade opportunities by further developing a robust and sustainable marine aquaculture industry. Failing to make these investments will result in aquaculture companies continuing to invest in operations overseas, drawing expertise, capital, and opportunities away from U.S. communities.

#### ENFORCEMENT \$70,858,000

NOAA requests a net increase of \$1,018,000 in FY 2017 program changes in the Enforcement sub-program for a total of \$70,858,000. Highlights include:

**Enforcement: Expanding NOAA's Cooperative Enforcement Program:** NOAA requests an increase of \$1,018,000 to improve efforts to enforce import restrictions on illegally-harvested and improperly documented seafood and marine resources in collaboration with state and territorial partners through Joint Enforcement Agreements (JEAs). NOAA will use these funds to strengthen and leverage existing partnerships and inspection resources, as well as to add IUU detection and deterrence capabilities in states where NOAA has not had a presence



NOAA enforcement personnel and state partners inspect a shipment for compliance with fisheries regulations.

in the past. The funds will be distributed to existing and new partners at key strategic ports of entry. This initiative is complemented by a requested increase in the Fisheries Science and Management sub-program described above (see p. 14).

#### HABITAT CONSERVATION AND RESTORATION \$58,390,000

NOAA requests a net decrease of \$3,523,000 in FY 2017 program changes in the Habitat Conservation and Restoration sub-program for a total of \$58,390,000. Highlights include:

**Habitat Conservation and Restoration: Increase Consultation and Essential Fish Habitat Implementation Capacity:** NOAA requests an increase of \$6,477,000 to build capacity for MSA Essential Fish Habitat (EFH) consultations to address significant growing and emerging permitting needs due to Gulf of Mexico restoration, road and bridge construction activities, drought projects, and other activities. At current staffing levels, NOAA cannot address the existing EFH consultation demands, impacting NOAA's ability to protect habitats needed to support the nearly \$200 billion U.S. commercial and recreational fishing industry. This request, along with the proposed increase above for ESA and MMPA consultations in the Protected Resources Science and Management sub-program (see p. 12), is part of a broad NOAA initiative to expand capacity needed to expedite review and permitting of public and private development projects that benefit the Nation's economy and create new jobs.

**Habitat Conservation and Restoration: Coastal Ecosystem Resiliency Grants:** NOAA requests a decrease of \$10,000,000 for Coastal Ecosystem Resiliency Grants to consolidate FY 2017 funds with NOS' request for an expanded Regional Coastal Resilience Program (see p. 8, Chapter 2). These funds are being consolidated into the NOS request for a total of \$20,000,000, which will allow NOAA to more comprehensively address ecosystem, fishing, community, and economic resilience challenges across the U.S. due to extreme weather events, coastal inundation, changing ocean conditions, and competing uses. The competitive grants program will expand funding opportunity for resilience planning, coastal habitat protection and restoration, and regional approaches that promote resilience by leveraging existing efforts and collaborations. The solicitations for NOAA's resiliency grants in 2015 yielded \$151 million in requests, far exceeding the available funding. This demonstrates the significant

unmet need for resilience tools and project implementation nationwide.

#### DISCRETIONARY FUNDS

##### FISHERIES DISASTER ASSISTANCE FUND

In FY 2017, NOAA requests \$9,000,000 for a new program to support activities that improve environmental and economic resilience of fisheries designated a fishery disaster by the Secretary. NOAA will use the fund for activities that restore the fishery, increase ecosystem resilience, and reduce the likelihood of future fishery disasters.

##### FISHERMEN'S CONTINGENCY FUND

The Fishermen's Contingency Fund allows NOAA to compensate U.S. commercial fishermen for damage or loss of fishing gear, vessels, or revenues caused by oil and gas-related obstructions in any area of the Outer Continental Shelf (OCS). The funds are derived from fees collected annually by the Secretary of the Interior.

##### FOREIGN FISHING OBSERVER FUND

The Foreign Fishing Observer Fund is financed through fees collected from owners and operators of foreign fishing vessels fishing within the U.S. Exclusive Economic Zone (EEZ) (e.g., such fishing requires a permit issued under the MSA). The fund is used by NOAA to pay salaries, administrative costs, data editing and entry costs, and other costs incurred for these observers.

##### FISHERIES FINANCE PROGRAM ACCOUNT

The Fisheries Finance Program is a national loan program that makes long-term, fixed-rate financing available to U.S. citizens who otherwise qualify for financing or



West coast fishing vessels.



Coral reefs, like this one in Florida's Biscayne Bay, benefit from NOAA's efforts to protect essential fish habitat.

refinancing for the construction, reconstruction, reconditioning, or the purchasing of fishing vessels, shoreside processing, aquaculture, mariculture facilities, or individual fishing quota.

##### MARINE MAMMAL UNUSUAL MORTALITY EVENT FUND

An unusual mortality event 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." This fund supports efforts to examine carcasses and live stranded animals allowing understanding of threats and stressors and the ability to determine when a situation is "unusual."

##### PACIFIC COASTAL SALMON RECOVERY FUND

The Pacific Coastal Salmon Recovery Fund was established by Congress in FY 2000 to protect, restore, and conserve Pacific salmonids and their habitats. NMFS provides competitive funding to states and Tribes of the Pacific Coast region. 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). The FY 2017 budget requests \$65,000,000 for this account, which is the same as the FY 2016 enacted level. In FY 2017, NOAA will continue to ensure that riparian buffer protection and restoration receives priority for funding. NOAA will also continue ongoing collaborative work with the U.S. Department of Agriculture and the U.S. Environmental Protection Agency to jointly identify and target the highest priority salmon habitat restoration areas in the region for Federal outreach and funding.



Native shellfish, including geoducks, mussels, and clams, improve water quality and support a vibrant commercial shellfish industry worth over \$180M in Washington State. Credit: NOAA/Su Kim.

## MANDATORY FUNDS

### PROMOTE AND DEVELOP AMERICAN FISHERY PRODUCTS & RESEARCH PERTAINING TO AMERICAN FISHERIES FUND

The American Fisheries Promotion Act (AFPA) of 1980 amended the Saltonstall-Kennedy (S-K) Act to authorize a grants program for fisheries research and development projects to be carried out with the funds in the Promote and Develop account. Funds are derived from a transfer from the Department of Agriculture to NOAA from duties on imported fisheries products. An amount equal to 30 percent of these duties is made available to NOAA and, after transfers, is available to carry out the purposes of the AFPA and the S-K program.

### FISHERIES FINANCE PROGRAM ACCOUNT

The mandatory component of the Fisheries Finance Program Account authority is subject to the Federal Credit Reform Act of 1990 (FCRA) (2 U.S.C. 661). The FCRA requires estimated loan costs to be appropriated in cash when Congress authorizes annual credit ceilings.

### FEDERAL SHIP FINANCING FUND

This account manages the loan guarantee portfolio that existed prior to the enactment of the FCRA.

### ENVIRONMENTAL IMPROVEMENT AND RESTORATION FUND

The Environmental Improvement and Restoration Fund was created by the Department of the Interior and Related Agencies Appropriations Act of 1998 for the purpose of carrying out marine research activities in the North Pacific.

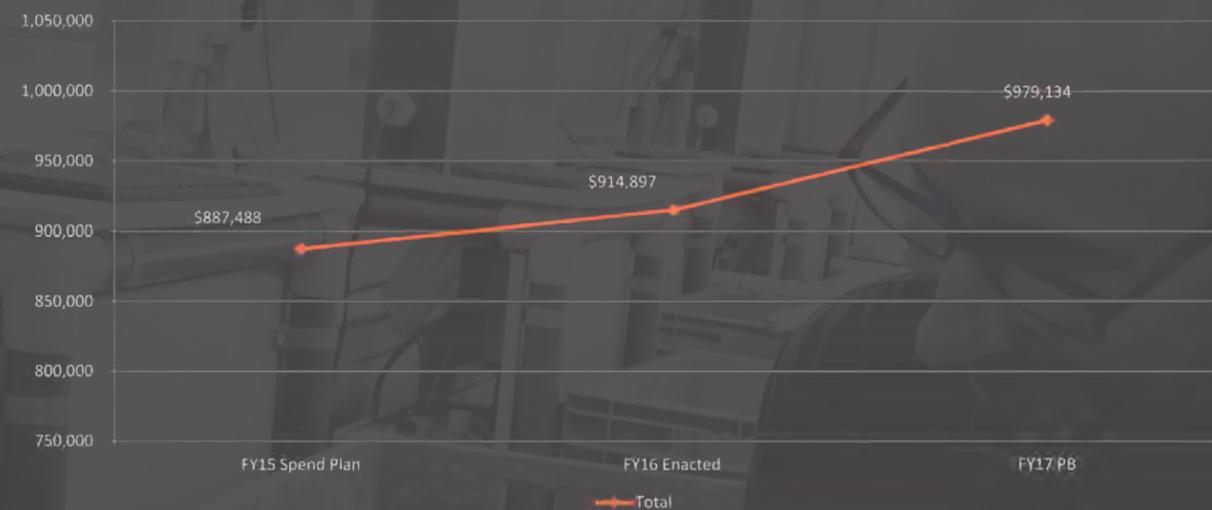
### LIMITED ACCESS SYSTEM ADMINISTRATION FUND

Under the authority of the MSA Section 304(d)(2)(A), NMFS must collect a fee to recover incremental costs of management, data collection, and enforcement of Limited Access Privilege programs. Fees are deposited into the Limited Access System Administration Fund. Fees shall not exceed three percent of the ex-vessel value of fish harvested under any such program.

### WESTERN PACIFIC SUSTAINABLE FISHERIES FUND

Section 204(e) of the 2006 amendments to the MSA authorizes the establishment of the Western Pacific Sustainable Fisheries Fund to allow foreign fishing within the U.S. EEZ in the Western Pacific through a Pacific Insular Area Fishery Agreement.

NMFS Discretionary Budget Trends (FY 2015-2017)  
(\$ thousands)



### FISHERIES ASSET FORFEITURE FUND

Section 311(e)(1) of the MSA authorizes the Secretary of Commerce to pay certain enforcement-related expenses from fines, penalties, and forfeiture proceeds received for violations of the MSA, MMPA, National Marine Sanctuaries Act, or any other marine resource law enforced by the Secretary. NOAA has established a Civil Monetary Penalty/Asset Forfeiture Fund.

### NORTH PACIFIC OBSERVER FUND

The North Pacific Groundfish Observer Program places all vessels and processors in the groundfish and halibut fisheries off Alaska into one of two observer coverage categories: (1) a full coverage category, and (2) a partial coverage category. In the partial coverage category, landings from all vessels will be assessed a 1.25 percent fee on standard ex-vessel prices of the landed weight of groundfish and halibut. Money generated by this fee will pay for observer coverage in the partial coverage category in the following year.

# CHAPTER 4 OFFICE OF OCEANIC AND ATMOSPHERIC RESEARCH

MODIS (aqua) satellite image of the 2015 Lake Erie Harmful Algal Bloom. Initial analysis indicates that the 2015 harmful algal bloom was the most severe bloom in terms of biomass this century.

**NOAA's** Office of Oceanic and Atmospheric Research (OAR) is the central research line office that integrates research across NOAA. OAR's science enables NOAA to fulfill its diverse mission, both today and into the future. OAR supports laboratories and programs across the United States and collaborates with external partners, including 16 NOAA-funded Cooperative Institutes and 33 Sea Grant Institutions. OAR research contributes to accurate weather forecasts, enables communities to plan for and respond to climate events such as drought, and enhances the protection and management of the Nation's coastal and ocean resources.

## FY 2017 REQUEST \$519,789,000

In FY 2017, NOAA requests a total of \$519,789,000 to support OAR's continued and enhanced operations. OAR's FY 2017 request supports its activities to accelerate the transition of promising research to operations, provide climate products and information to communities, conduct research to enhance severe weather forecast capability, and develop tools and technologies to monitor ocean acidification. This total includes Operations, Research, and Facilities (ORF) and Procurement, Acquisition, and Construction (PAC) accounts and is composed of a net increase of \$30,758,000 in FY 2017 program changes.



Installing a new aerosol instrument package onboard a Manta unmanned aircraft system platform. When paired with the agile Manta, the compact and lightweight instrument becomes a powerful new tool for NOAA to address climate and air quality issues related to aerosols in remote and hard-to-access regions. Credit: Karen Rosenlof

## FY 2017 ORF BUDGET SUMMARY

NOAA requests a total of \$493,410,000 to support the Operations, Research, and Facilities of OAR, reflecting a net increase of \$24,458,000 in FY 2017 program changes.

### ORF PROGRAM CHANGE HIGHLIGHTS FOR FY 2017:

Program changes above \$1,000,000 are highlighted below. A summary of funding by Program, Project, and Activity (PPA) is located in Appendix 2. Detailed

descriptions of all program changes by PPA are located in the NOAA FY 2017 Congressional Justification.

## CLIMATE RESEARCH \$189,866,000

NOAA requests a net increase of \$30,760,000 in FY 2017 program changes in the Climate Research sub-program for a total of \$189,866,000. Highlights include:

**Climate Laboratories and Cooperative Institutes: Atmospheric Baseline Observatories:** NOAA requests an increase of \$3,000,000 to return all six

Atmospheric Baseline Observatories (ABOs) to full operations, continuing the more than 50 years of observations collected at these facilities around the world. ABOs record trends and distributions of atmospheric constituents influencing global climate, ozone depletion, and changes in baseline air quality. Due to rising costs at remote sites and a decline in cooperative support, ABOs have experienced deferred maintenance and reduced observation capabilities over time. NOAA's ABOs are located in Barrow, AK; Trinidad Head, CA; Summit, Greenland; Mauna Loa, HI; American Samoa; and South Pole, Antarctica.

**Climate Laboratories and Cooperative Institutes: Greenhouse Gas Monitoring in Support of the President's Climate Action Plan:** NOAA requests an increase of \$2,975,000 to use atmospheric composition data from existing global networks to deliver greenhouse gas emission measurements that help evaluate efforts to reduce greenhouse gases, including carbon dioxide, methane, nitrous oxide, and the full suite of chlorofluorocarbon (CFC) replacements.

**Climate Laboratories and Cooperative Institutes: U.S. Global Change Research Program:** NOAA requests an increase of \$4,518,000 to conduct research and other activities in support of the U.S. Global Change Research Program's priority areas, including extreme weather, water, and climate events such as heat waves, droughts, and floods. Better understanding of these priority research areas will help inform community resilience efforts in the wake of a changing climate.



An Air Resources Laboratory engineer works on a U.S. Climate Reference Network (USCRN) site in Wolf Point, MT. The USCRN is a systematic and sustained network of climate monitoring stations with sites across the conterminous U.S., Alaska, and Hawaii that provide a continuous series of climate observations like temperature, precipitation, wind speed, and soil conditions.

**Regional Climate Data and Information: Assessments:** NOAA requests an increase of \$3,970,000 to help complete the fourth National Climate Assessment in 2018 and support a more robust process for future assessments in compliance with The Global Change Research Act of 1990. The Act requires submission of a regular climate assessment (developed by several Federal agencies including NOAA) to Congress that examines latest climate research, uncertainty, effects of global change, and emerging trends.

**Regional Climate Data and Information: Regional Integrated Sciences and Assessments:** The Regional Integrated Sciences and Assessments program supports research teams that help expand and build the Nation's capacity to prepare for and adapt to climate variability and change. NOAA requests an increase of \$3,912,000 to expand regional research, information services, and competitive grants to manage climate risks and serve one additional region, as well as new communities in existing regions.

**Regional Climate Data and Information: NOAA Arctic Research Program - Arctic Observing Network:** NOAA requests an increase of \$4,255,000 to support further development of its Arctic Observing Network in areas of the Arctic, such as the Chukchi Sea, that are undergoing environmental change and commercial development at an unprecedented pace. The request will also help NOAA develop informational products related to Arctic Ocean changes, sea-ice extent, ecosystem evolution, and Arctic to mid-latitude weather-climate linkages.

**Regional Climate Data and Information: Climate Resilience Toolkit in support of the President's Climate Action Plan via the Climate.gov Portal:** NOAA requests an increase of \$2,300,000 to enhance the Climate Resilience Toolkit (CRT), which provides public online access to actionable climate data, information, and tools to help communities plan for the impacts of climate change. These efforts will make the CRT more intuitive and user-friendly through new features including interactive tools.

**Climate Competitive Research: Impacts of Climate on Fish Stocks:** NOAA requests an increase of \$5,830,000 to award competitive grants for research that improves understanding of the impacts of climate variability and change on fish stocks, prey availability, and habitat. This research will be used to develop decision-support tools and training, and to integrate climate information into fisheries management. Enhancing early-warning

and management strategies for the impacts of climate variability and change will help minimize economic disruption for the fishermen and coastal communities across the Nation whose livelihoods depend on healthy fisheries.

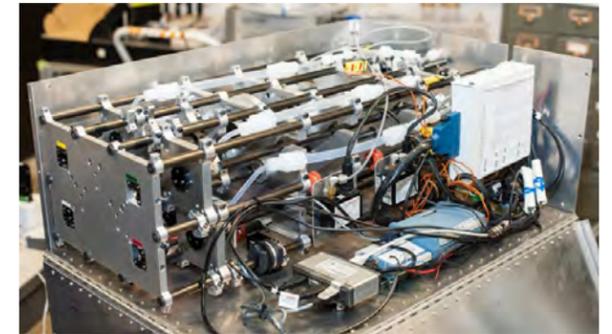
### WEATHER & AIR CHEMISTRY RESEARCH \$101,945,000

NOAA requests a net decrease of \$5,818,000 in FY 2017 program changes in the Weather & Air Chemistry Research sub-program for a total of \$101,945,000. Highlights include:

**Weather and Air Chemistry Laboratories and Cooperative Institutes: Vortex-Southeast:** NOAA requests a decrease of \$5,000,000 to terminate the Vortex-Southeast (SE) project in FY 2017. VORTEX-SE is a research effort that investigates the processes that produce tornadoes (with a focus on the Southeast, U.S. region); the way NWS forecasters anticipate, detect, and warn for tornadoes; and how end users receive and respond to information about tornadic activity. NOAA made considerable progress on Vortex-SE in FY 2015, awarding competitive grants to improve understanding of tornado development and risks, investing in observation systems in the Southeast, and holding a workshop for experts to identify tornado issues of special concern in the southeastern United States. In FY 2016, NOAA will launch a field effort to observe the growth of instability and shear in the atmosphere and the eventual thunderstorm activity associated with tornadoes and other large-scale weather systems.

**Weather and Air Chemistry Laboratories and Cooperative Institutes: Base Research:** NOAA requests a decrease of \$2,985,000 to reduce Cooperative Institute support for planned research projects. With this decrease, NOAA will narrow its research focus to improvements in weather forecasting, advances in near-term modelling, and transitioning research to operations.

**U.S. Weather Research Program: Improving the Airborne Detection and Understanding of Severe Weather:** NOAA requests an increase of \$4,642,000 to research and develop aircraft-based hazardous weather observing systems, such as the Airborne Phased Array Radar (APAR). Further investment in these systems will help NOAA and its partners develop a radar that is capable of doubling the amount of storm detail that can currently be gathered, which in turn will allow NOAA to issue more accurate forecasts and warnings of severe storms.



The NOy-Cavity Ring-Down Spectrometer is a sensitive, compact detector that measures total reactive nitrogen (NOy), as well as NO<sub>2</sub>, NO and O<sub>3</sub> using cavity ring-down spectroscopy. This product is unique in that the small, optical cage system allows measurements of all four trace gases simultaneously and with robust calibration. NOAA is now seeking manufacturers/licensees to deliver its Patent-Pending NOy Cavity Ring-Down Spectrometer to market in the United States and globally. Credit: Derek Parks.

**U.S. Weather Research Program: Research to Improve Mid-Range Operational Weather Outlooks:** NOAA requests an increase of \$3,936,000 to improve the accuracy of weather outlooks out to three to four weeks, where expertise does not currently exist. Increasing capability in developing mid-range outlooks will assist decision-makers in sectors ranging from food security and public health to emergency management and national security.

**Weather and Air Chemistry Research: Joint Technology Transfer Initiative:** NOAA requests to eliminate \$6,000,000 for a Joint Technology Transfer Initiative. NOAA supports an increase in funding to transition the latest scientific and technological advances into operations, but instead requests to expand this concept across NOAA's mission areas in its Research Transfer Acceleration Program in the Innovative Research and Technology sub-program as described below (see p. 23).

### OCEAN, COASTAL, AND GREAT LAKES RESEARCH \$179,455,000

NOAA requests a net decrease of \$10,484,000 in FY 2017 program changes in the Ocean, Coastal & Great Lakes Research sub-program for a total of \$179,455,000. Highlights include:

**Ocean, Coastal, and Great Lakes Research Laboratories and Cooperative Institutes: Autonomous Underwater Vehicle Demonstration:** NOAA requests a decrease of \$2,000,000 to reduce support for an Autonomous Underwater Vehicle demonstration. NOAA will maintain its fleet of autonomous vehicles and other



alternative technologies, but will reduce the funding available for ongoing development, testing, and evaluation activities.

**Ocean, Coastal, and Great Lakes Research Laboratories and Cooperative Institutes: Base Research:** NOAA requests a decrease of \$2,985,000 to reduce Cooperative Institute support for planned research projects. NOAA will decrease funded research across its Cooperative Institute partners, but will continue to make awards to Cooperative Institutes that leverage partnerships to make significant advancements in research.

**National Sea Grant College Program: National Sea Grant College Program Base:** NOAA requests a decrease of \$2,548,000 to fund approximately 30 fewer research projects compared to FY 2016.

**National Sea Grant College Program: Marine Aquaculture Program:** NOAA requests a decrease of \$2,000,000 to eliminate funding for 20 research and extension projects.

**Ocean Exploration and Research Program: Ocean Exploration:** NOAA requests a decrease of \$12,656,000, which will decrease our mapping and exploration of unknown ocean areas and phenomena. NOAA will narrow activities related to Extended Continental Shelf mapping, extramural grants, and Okeanos Explorer missions.

**Integrated Ocean Acidification Program: Integrated Ocean Acidification:** NOAA requests an increase of \$11,705,000 to expand the ocean acidification (OA) observing network to nearshore waters and to aid in the development of tools and OA adaptation strategies for



Researcher Lauren Valentino collects data from a Benthic Ecosystem Acidification Monitoring System station in the Flower Garden Banks National Marine Sanctuary to determine the rate and magnitude of climate change and acidification on coral reefs and ecological impacts.

affected industries and stakeholders, including the U.S. shellfish industry. This investment will make substantial advancements in OA observations, greatly expand understanding of the vulnerability of coastal communities, and further investigate OA adaptation options at local and regional scales, by providing data and products for coastal resource managers and other stakeholders.

#### INNOVATIVE RESEARCH AND TECHNOLOGY \$22,144,000

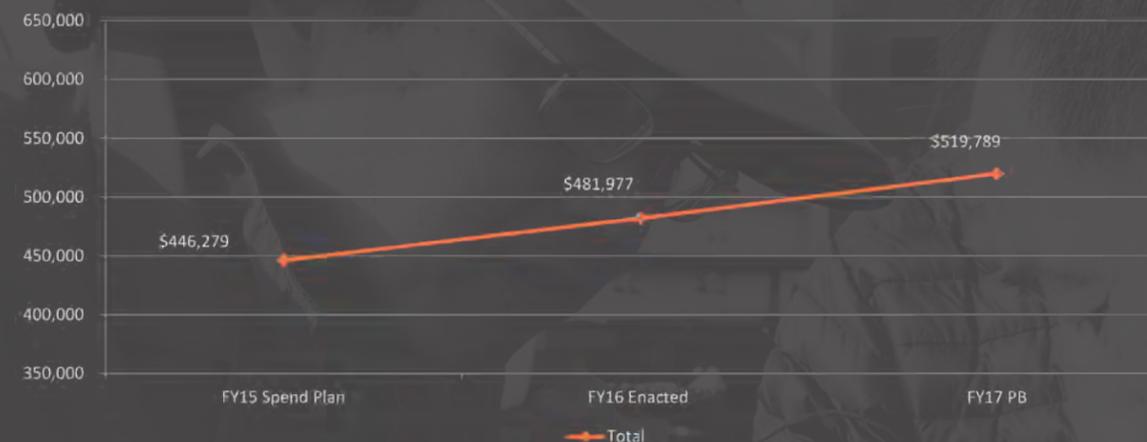
NOAA requests a net increase of \$10,000,000 in FY 2017 program changes in the Innovative Research and Technology sub-program for a total of \$22,144,000. Highlights include:

**Research Transition Acceleration Program: Research Transition Acceleration Program:** NOAA requests an increase of \$10,000,000 to create a new program for identifying, prioritizing, and funding transition of the most promising research into operations, applications, and commercialization. Numerous research projects with significant potential to benefit society are ready for rapid transition to operations. This initiative will ensure that NOAA-funded research projects identified for transition will be evaluated and prioritized for funding based on a common set of criteria, including mission criticality, societal benefit, early stakeholder engagement, and plans for reliable delivery of products and services. Ensuring successful research is transitioned into use ensures that the American public directly realizes the benefit of the previous R&D investments. When appropriate, the Research Transition Acceleration Program (RTAP) initiative will also evaluate project proposals from other government agencies and non-governmental entities.



MODIS (aqua) satellite image of the 2015 Lake Erie Harmful Algal Bloom. Initial analysis indicates that the 2015 harmful algal bloom was the most severe bloom in terms of biomass this century.

#### OAR Discretionary Budget Trends (FY 2015-2017) (\$ thousands)



#### FY 2017 PAC BUDGET SUMMARY

NOAA requests a total of \$26,379,000 to support Procurement, Acquisition, and Construction activities for OAR, reflecting a net increase of \$6,300,000 in FY 2017 program changes.

#### PAC PROGRAM CHANGE HIGHLIGHTS FOR FY 2017:

Program changes above \$1,000,000 are highlighted below. A summary of funding by Program, Project, and Activity (PPA) is located in Appendix 2. Detailed descriptions of all program changes by PPA are located in the NOAA FY 2017 Congressional Justification.

#### SYSTEMS ACQUISITION \$26,379,000

NOAA requests a net increase of \$6,300,000 in FY 2017 program changes in the Systems Acquisition sub-program for a total of \$26,379,000. Highlights include:

**Research Supercomputing: Research and Development High Performance Computing Recapitalization:** NOAA requests an increase of \$6,300,000 to continue recapitalization of its research and development (R&D) High Performance Computing (HPC) infrastructure.



GAEA is one of NOAA's high performance computing systems and is located at Oak Ridge National Laboratory in Oak Ridge, Tennessee.

Building on NOAA's FY 2016 request to begin recapitalization of Gaea, this would establish a new funding model to provide regular upgrades to NOAA's computing capacity, the backbone of our weather, climate, and broader environmental modeling efforts. The funding will allow regular refresh and recapitalization of NOAA's R&D HPC via a leasing mechanism, which shifts the burden of future equipment obsolescence to the service provider instead of NOAA continuing to purchase and own infrastructure that quickly becomes outdated.



# CHAPTER 5 NATIONAL WEATHER SERVICE

The Chicago NEXRAD located in Romeoville, IL.

**NOAA's** National Weather Service (NWS) provides weather, water, and climate forecasts and warnings for the protection of life, property, and the national economy. NWS is the official authority for issuing warnings during life-threatening weather events. NWS forecasters issue public, aviation, marine, fire weather, climate, space weather, river and flood forecasts and warnings every day. Each year, NWS collects approximately 76 billion observations and issues approximately 1.5 million forecasts and 50,000 warnings. NWS data and products are publicly available through a national information infrastructure used by the public, other governmental agencies, the private sector, and the global community.

## FY 2017 REQUEST \$1,119,292,000

In FY 2017, NOAA requests a total of \$1,119,292,000 to support NWS' weather, water, and climate products; services; and advancements and to continue to evolve and modernize the NWS. This total includes Operations, Research, and Facilities (ORF) and Procurement, Acquisition, and Construction (PAC) accounts and reflects a net decrease of \$18,551,000 in FY 2017 program changes.

## FY 2017 ORF BUDGET SUMMARY

NOAA requests a total of \$976,507,000 to support the Operations, Research, and Facilities of the NWS, reflecting a net decrease of \$26,021,000 in FY 2017 program changes.

### ORF PROGRAM CHANGE HIGHLIGHTS FOR FY 2017:

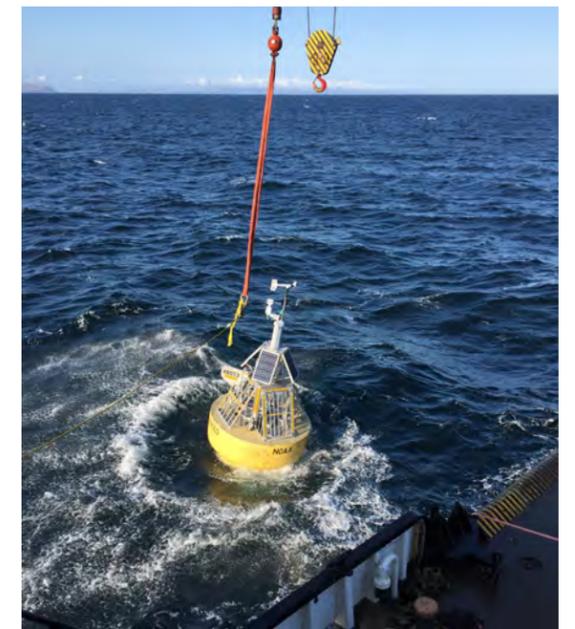
Program changes above \$1,000,000 are highlighted below. A summary of funding by PPA is located in Appendix 2. Detailed descriptions of all program changes by PPA are located in the NOAA FY 2017 Congressional Justification.

### OBSERVATIONS \$222,996,000

NOAA requests a net decrease of \$11,487,000 in FY 2017 program changes for a total of \$222,996,000 in the Observations sub-program. Highlights include:



A Sudbury, MA house under considerable snow after the January 27, 2015 northeast blizzard. Credit: Marc Stern.



The NOAA National Data Buoy Center developed and deployed the Self-Contained Ocean Observation Payload (SCOOP) in the Atlantic and Gulf of Mexico basins. SCOOP aims to significantly increase NOAA's buoy observation system readiness and effectiveness.

**Observations: National Mesonet Program:** NOAA requests a decrease of \$11,487,000 for the National Mesonet Program, a network of automated weather stations that are spaced closely together to provide high-frequency, high-density weather observations. At this level, NOAA will continue to administer the National Mesonet Program. Funding will be provided for lightning data procurements consistent with the Consolidated Appropriations Act, 2016. The lightning data, like other mesonet data, increases NWS' ability to warn for severe weather. NWS is using FY 2016 funding to ingest data from mesonets, which can identify small scale features at the Earth's surface,

such as changes in wind speed/direction, temperature, and pressure, each of which can indicate rapidly deteriorating weather conditions not shown by other observations.

#### CENTRAL PROCESSING \$88,388,000

NOAA requests a net decrease of \$4,969,000 in FY 2017 program changes for a total of \$88,388,000 in the Central Processing sub-program. Highlights include:

**Central Processing: Advanced Weather Interactive Processing System Cyclical Refreshment:** NOAA requests an increase of \$5,131,000 to provide the minimal funding levels required for Advanced Weather Interactive Processing System (AWIPS) information technology (IT) cyclical replacement for AWIPS servers, workstations, monitors, and printers. AWIPS is an interactive computer system that integrates all meteorological and hydrological data, and all satellite and radar data, and enables the forecaster to prepare and issue more accurate and timely forecasts and warnings. Without these funds, NWS will need to delay AWIPS cyclical hardware replacement from the previous replacement period of three-to-five years to six-to-eight years. By deferring cyclical replacement of computer equipment, AWIPS equipment will fail at higher rates and experience more component degradation, which in turn may increase system downtime.

**Central Processing: Establishment of Regional Enterprise Application Development and Integration Teams:** NOAA requests a decrease of \$10,100,000 to reflect efficiencies achieved in the delivery of IT support services to field offices through investments in open source software and implementation of IT best practices. NOAA proposes to continue IT support for the field in the form of Regional Enterprise Application Development and Integration (READI) teams located in each of the six NWS Regions and the National Headquarters. The READI teams will provide cost-effective, sustainable IT delivery operations and allow NOAA to take advantage of significant technological advancements.

#### ANALYZE, FORECAST, AND SUPPORT \$485,931,000

NOAA requests a net decrease of \$4,686,000 in FY 2017 program changes for a total of \$485,931,000 in the Analyze, Forecast, and Support sub-program. Highlights include:

**Analyze, Forecast and Support (and Science and Technology Integration): Integrated Water Prediction:** NOAA requests an increase of \$5,250,000 to develop and



Senator Richard Shelby, Commerce Secretary Penny Pritzker, NOAA Administrator Dr. Kathryn Sullivan and other partners, including USGS and FEMA, were on hand to cut the ribbon at the National Water Center in Tuscaloosa, Alabama, on May 26, 2015. The new building will house the nation's water experts.

operate the Nation's first Integrated Water Prediction (IWP) capability by aligning, integrating, and expanding key atmospheric, terrestrial, and coastal water prediction capabilities across NOAA. IWP will deliver water products to stakeholders such as emergency managers and local decision makers. These will include unified, consistent, and high-resolution forecasts, as well as the corresponding tools and decision support needed to effectively prepare for and respond to challenges such as floods, droughts, and other high-impact events. This request is part of a cross-line office initiative with NOAA's National Ocean Service (NOS) and begins a multi-year strategy to improve water intelligence services provided to the Nation. This work will largely be done at the National Water Center (NWC) in Tuscaloosa, Alabama, where it will benefit from the work of NOAA and other Federal agencies with water expertise. For more information on this joint initiative between NWS and NOS, please see p. 29 and p. 7 in Chapter 3.

**Analyze, Forecast and Support: National Tsunami Hazard Mitigation Program Grants:** NOAA requests a decrease of \$6,000,000 in the National Tsunami Hazard Mitigation Program grants, which would eliminate grant funding to partners for education, outreach, and awareness programs in FY 2017. NOAA will maintain its strong forecast and warning program through the operations of its two Tsunami Warning Centers and continued administration of the TsunamiReady™ Program.

**Analyze, Forecast and Support: Elimination of Redundant Regional Telecommunication Circuits:** NOAA requests a decrease of \$3,000,000 to reflect efficiencies gained by consolidating regional NWS telecommunication circuits into the one-NWS network. As part of the evolution of NWS, NOAA is modernizing its dissemination network with improved bandwidth and reliability.

#### DISSEMINATION \$47,236,000

NOAA requests a net increase of \$2,000,000 in FY 2017 program changes for a total of \$47,236,000 in the Dissemination sub-program. Highlights include:

**Dissemination: NOAA Weather Radio Operations and Maintenance:** NOAA requests an increase of \$2,000,000 for the NOAA Weather Radio (NWR) network. This request increases NWR funding to minimum levels to allow operation of all 1,029 current transmitter stations. NWR infrastructure is a national warning network with a broadcast coverage that currently reaches more than 98 percent of the Nation's population and provides critical weather and other hazard information to U.S. public and media outlets. Without this funding, NWS will be required to decommission approximately 235, or about 23 percent, of the NWR transmitter stations.

#### SCIENCE AND TECHNOLOGY INTEGRATION \$131,956,000

NOAA requests a net decrease of \$6,879,000 in FY 2017 program changes for a total of \$131,956,000 in the Science and Technology Integration sub-program. Highlights include:

**Science and Technology Integration: Shift R2O toward an Integrated Approach:** NOAA requests a decrease of \$3,000,000 to account for efficiencies gained by shifting from separate regional- and event-specific modeling toward more integrated, global modeling approaches. NOAA will integrate projects such as Next Generation Global Prediction System (NGGPS) and Mid-Range Weather Outlooks to improve service delivery. NWS will shift focus away from existing R2O efforts, such as the Hurricane Forecast Improvement Project (HFIP) program, that are highly specialized. However, improvements made from HFIP will be maintained and improvements to hurricane forecasting will continue within other modeling efforts.

**Science and Technology Integration: Consumer Option for an Alternative System to Allocate Losses Act:** NOAA requests a decrease of \$4,629,000 in the FY 2017 budget from the additional funds provided to Science and Technology Integration in the Consolidated Appropriations Act, FY 2016 to advance essential components of the Consumer Option for an Alternative System to Allocate Losses (COASTAL) Act of 2012. The COASTAL Act requires NOAA to produce detailed "post-storm assessments" in the aftermath of a damaging tropical cyclone that strikes the United States or its territories. NWS will



A tornado crosses the road behind the town of Reinbeck, Iowa by Brad Goddard, Orion IL. This photo took third place for professional submissions in NOAA's Weather in Focus 2015 Photo Contest.

further COASTAL Act objectives to the extent possible within our base budget and will continue to make available its observational and model data related to land falling tropical cyclones.

## FY 2017 PAC Budget Summary

NOAA requests a total of \$142,785,000 to support Procurement, Acquisition, and Construction activities of the NWS, reflecting a net increase of \$7,470,000 in FY 2017 program changes.

### PAC PROGRAM CHANGE HIGHLIGHTS FOR FY 2017:

Program changes above \$1,000,000 are highlighted below. A summary of funding by PPA is located in Appendix 2. Detailed descriptions of all program changes by PPA are located in the NOAA FY 2017 Congressional Justification.

#### SYSTEMS ACQUISITION \$134,135,000

NOAA requests a net increase of \$7,470,000 in FY 2017 program changes for a total of \$134,135,000 in the Systems Acquisition sub-program. Highlights include:

**Observations: Automated Surface Observing System Service Life Extension Program:** NOAA requests an increase of \$7,500,000 to begin a Service Life Extension Program (SLEP) for the aging Automated Surface Observing System (ASOS), the Nation's primary surface weather observing network. ASOS data increases accuracy and timeliness of NWS forecasts and warnings, particularly near airports, enhancing aviation safety and efficiency. This request synchronizes NOAA's upgrade process with the Federal Aviation Administration's, yielding efficiencies across the government. Without this investment, ASOS availability will degrade rapidly beginning in 2017, causing data outages and regional gaps in service and undermining NOAA's ability to provide aviation and general forecasts.

**Observations: Next Generation Weather Radar Service Life Extension Program:** NOAA requests a planned increase of \$8,535,000 to continue implementation of the Next Generation Weather Radar (NEXRAD) SLEP to extend the utility of existing infrastructure through 2030. NEXRAD underpins the severe weather forecast and warning services that are critical to maintaining a Weather-Ready Nation during high-impact events. This effort began in FY 2015 and will continue through FY 2022. Without this continued investment, NEXRAD availability

will degrade beginning in 2020, resulting in radar outages and gaps and negatively impacting tornado and flash flood warnings.

### OBSERVATIONS BUDGET AUTHORITY IN THOUSANDS

FY 2017 Request	\$32,755	FY 2020	\$20,999
FY 2018	\$32,953	FY 2021	\$16,944
FY 2019	\$22,909		

#### Central Processing: Integrated Water Prediction:

NOAA requests an increase of \$4,500,000 to procure operational high performance computing (HPC) resources to enable modeling improvements associated with the Integrated Water Prediction (IWP) initiative. IWP will put critical water forecast information into the hands of local decision makers and members of the public. Specifically, these funds will support coupling of the current generation of terrestrial and coastal models and develop the next generation of integrated Earth system coupled models necessary to expand NOAA's water forecast and warning products and services. The HPC supporting IWP will advance both scientific discovery and economic competition by delivering crucial water resource information to decision makers at multiple geographic scales. For more information on this joint initiative between NWS and NOS, please see p. 27 and p. 7 in Chapter 3.

#### Central Processing: Research and Development Supercomputing:

NOAA requests a decrease of \$2,000,000 for High Performance Computing (HPC) resources supporting the Hurricane Forecast Improvement Project (HFIP). NOAA will continue to sustain HFIP HPC at current levels, consistent with recent HFIP scope reductions.

### CENTRAL PROCESSING BUDGET AUTHORITY IN THOUSANDS

FY 2017 Request	\$66,761	FY 2020	\$66,761
FY 2018	\$66,761	FY 2021	\$66,761
FY 2019	\$66,761		

## NWS Discretionary Budget Trends (FY 2015-2017) (\$ thousands)



#### Dissemination: Re-architected NWS Telecommunications Gateway:

NOAA requests a decrease of \$7,604,000 to reflect the completion in FY 2017 of a re-architected National Weather Service Telecommunications Gateway (NWSTG) at the primary and backup sites. The re-architected NWSTG capability enables modern, scalable, and reliable dissemination services – which NWS requires to send out its watches, warnings, and forecasts in a timely manner – using current best practices. It will also ensure NOAA is poised to accommodate future data increases driven by new satellites, increases in environmental model prediction capabilities, and radar data.

#### Dissemination: Ground Readiness Project:

NOAA requests a decrease of \$3,461,000 to reflect the completion of the Ground Readiness Project. In 2017, NOAA will have built the required infrastructure to ensure adequate processing, delivery and exploitation of anticipated data from GOES-R, JPSS, and other recently- or soon-to-be-deployed satellites; radar; and model data. The Ground Readiness Project upgrade will ensure that the full life- and property-saving potential of NOAA's satellite, model, and radar investments is realized.

#### NWS CONSTRUCTION \$8,650,000

NOAA requests a total of \$8,650,000 in the Construction sub-program.

### FACILITIES CONSTRUCTION AND MAJOR REPAIRS BUDGET AUTHORITY IN THOUSANDS

FY 2017 Request	\$8,650	FY 2020	\$8,650
FY 2018	\$8,650	FY 2021	\$8,650
FY 2019	\$8,650		



Maintenance being performed at the Chicago NEXRAD located in Romeoville, IL.

### DISSEMINATION BUDGET AUTHORITY IN THOUSANDS

FY 2017 Request	\$34,619	FY 2020	\$24,919
FY 2018	\$24,919	FY 2021	\$24,919
FY 2019	\$24,919		

# CHAPTER 6 NATIONAL ENVIRONMENTAL SATELLITE, DATA AND INFORMATION SERVICE

Hurricane Joaquin Seen From GOES West

**NOAA's** The National Environmental Satellite, Data, and Information Service (NESDIS) provides timely access to global environmental data from satellites and other sources to promote, protect, and enhance the Nation's economy, security, environment, and quality of life. Along with launching and operating NOAA's satellites, NESDIS manages the product development and distribution of vast amounts of environmental data. NOAA satellites support the weather forecasting enterprise by providing timely, high quality data for model outputs. While providing real-time operations and data services, NESDIS also works to develop the next generation of satellites to meet its primary mission essential functions without incurring gaps in coverage.

## FY 2017 REQUEST \$2,303,687,000

NOAA requests a total of \$2,303,687,000 to support the continued and enhanced operations of NESDIS. This total includes Operations, Research, and Facilities (ORF) and Procurement, Acquisition, and Construction (PAC) accounts and includes a net decrease of \$49,161,000 in FY 2017 program changes. Of particular note, this request includes continued support for development of NOAA's Polar Follow On and Space Weather Follow On satellite systems. In addition, NOAA's FY 2017 budget includes funds to support further evaluation and testing of commercial space-based data for NOAA operations.

## FY 2017 ORF BUDGET SUMMARY

NOAA requests a total of \$239,987,000 to support the Operations, Research, and Facilities of NESDIS, reflecting a net increase of \$8,470,000 in FY 2017 program changes.

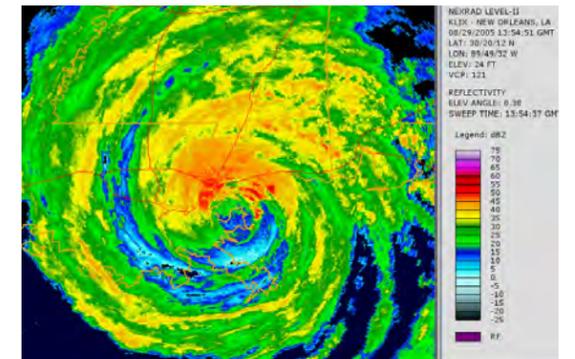
### ORF PROGRAM CHANGE HIGHLIGHTS FOR FY 2017:

Program changes above \$1,000,000 are highlighted below. A summary of funding by PPA is located in Appendix 2. Detailed descriptions of all program changes by PPA are located in the NOAA FY 2017 Congressional Justification.

### ENVIRONMENTAL SATELLITE OBSERVING SYSTEMS \$176,509,000

NOAA requests a net increase of \$7,209,000 for a total of \$176,509,000 in the Environmental Satellite Observing Systems sub-program. Highlights include:

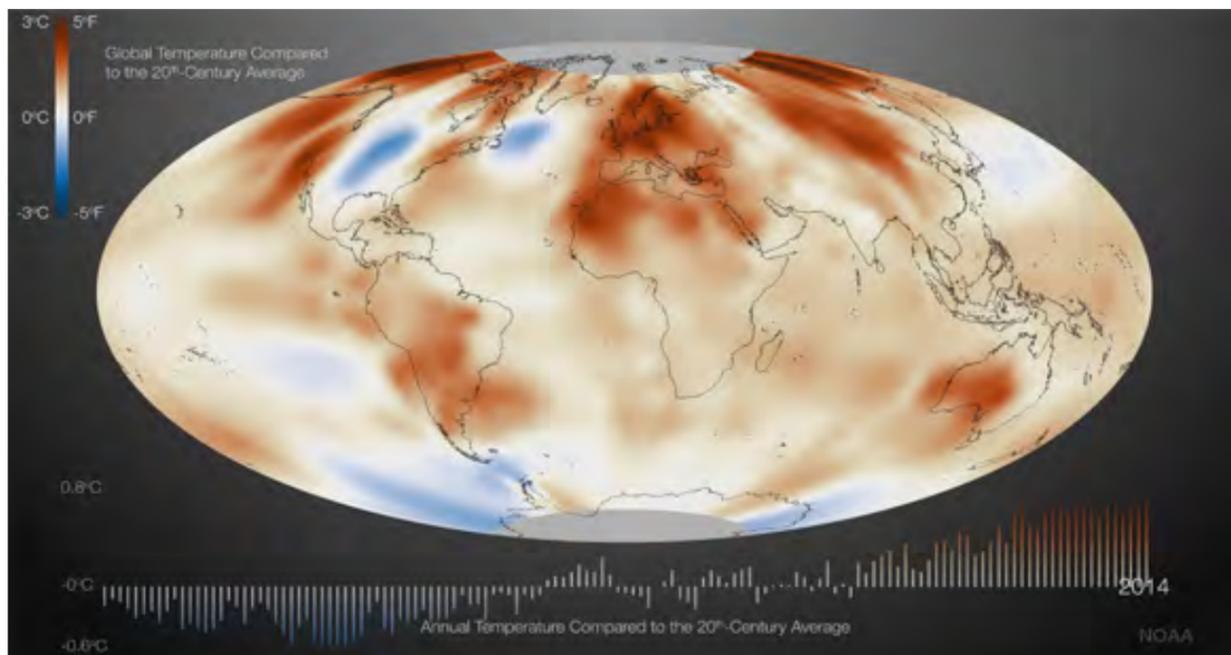
**NESDIS IT Security (Satellite and Product Operations):** NOAA requests an increase of \$3,581,000 to improve data flow resiliency across critical IT systems and infrastructure. Specifically, this request will fund the Office of Satellite and Product Operations' efforts to identify and mitigate vulnerabilities affecting the availability, integrity, security, and delivery of NOAA's data. NOAA will use these funds to migrate NESDIS' Federal Information Security Management Act high impact networks to NOAA Office of Chief Information Officer (OCIO) enterprise services, enabling centralized authentication and automated deployment of security patches. This request is part of a cross-line office initiative with NOAA's OCIO to modernize and



On October 27, 2015, Amazon Web Services announced the public release of NOAA's Next-Generation Weather Radar, (NEXRAD) data for public use. As a part of NOAA's Big Data Project, this effort gives more users equal access to the data and allows them to easily develop comprehensive statistical and probabilistic products while still maintaining NOAA's role as the official archive of the NEXRAD data.

streamline NOAA's IT systems. NOAA uses complex IT systems to produce weather forecasts; issue advisories, watches, and warnings; and disseminate environmental information. IT system failures caused by cyber-attack, equipment malfunctions, or disasters threaten NOAA's ability to collect and process raw meteorological data, analyze and model weather, and disseminate the information and warnings that save lives and preserve property. For more information on this joint initiative between NESDIS and OCIO, please see p. 33 and p. 40 in Chapter 7.

**Commercial Remote Sensing Regulatory Authority (CRSRA):** NOAA requests an increase of \$1,065,000 to increase capacity to support additional compliance oversight responsibilities associated with a recent change in operations allowing the sale of U.S. commercial satellite imagery. This request will allow CRSRA to administer and fulfill its statutory obliga-



In 2014, the most essential indicators of Earth's changing climate continued to reflect trends of a warming planet, rising land and ocean temperature, sea levels, and greenhouse gases set new records. These key findings and others can be found in the "State of the Climate in 2014" report released online by the American Meteorological Society. The report was compiled by NOAA's Center for Weather and Climate at the National Centers for Environmental Information and is based on contributions from 413 scientists from 58 countries around the world.

tion to regulate private remote sensing systems through a licensing regime that allows the licensee to operate its space system consistent with the terms of its particular license. This includes carrying out enforcement activities to address substantial violations of U.S. laws, regulations, and NOAA-issued licenses. CRSRA is the sole U.S. Government entity to develop and administer regulations for any U.S. private remote sensing space system that is capable of sensing the Earth's surface.

**Office of Space Commerce (OSC) (formerly Office of Space Commercialization):** NOAA requests an increase of \$1,400,000 to increase the capacity of OSC to promote a robust and transparent marketplace for commercial space business through evaluation of opportunities for use of commercial data to meet NOAA's space based operational requirements. The NOAA Commercial Space Policy establishes critical components for engaging with the commercial sector, including designating OSC as a single point of entry for commercial providers to streamline the process for easier engagement with NOAA. This request will equip OSC with the resources to serve as NOAA's conduit for commercial vendors.

#### NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION \$63,478,000

NOAA requests a net increase of \$1,261,000 for a total of \$63,478,000 in the National Centers for Environmental Information sub-program. Highlights include:

**IT Security (National Centers for Environmental Information (NCEI)):** NOAA requests an increase of \$1,261,000 to improve data flow resiliency across NOAA's critical IT systems and infrastructure. Specifically, this request will fund NCEI efforts to identify and mitigate vulnerabilities affecting the availability, integrity, security, and delivery of NOAA's data. NOAA will use these funds to migrate NESDIS' Federal Information Security Management Act high impact networks to NOAA OCIO enterprise services, enabling centralized authentication and automated deployment of security patches. This request is part of a cross-line office initiative with NOAA's OCIO to modernize and streamline NOAA's IT systems. Access to reliable and accurate long-term records of environmental data and information is critical to businesses, academic institutions, and government agencies involved in national security, public safety, and economic and environmental issues. For more information on this joint initiative between NESDIS and OCIO, please see p. 32 and p. 40 in Chapter 7.

## FY 2017 PAC BUDGET SUMMARY

NOAA requests a total of \$2,063,700,000 to support the Procurement, Acquisitions, and Construction (PAC) activities of NESDIS, reflecting a net decrease of \$57,631,000 in FY 2017 program changes.

### PAC PROGRAM CHANGE HIGHLIGHTS FOR FY 2017:

Program changes above \$1,000,000 are highlighted below. A summary of funding by Program, Project, and Activity (PPA) is located in Appendix 2. Detailed descriptions of all program changes by PPA are located in the NOAA FY 2017 Congressional Justification.

**SYSTEMS ACQUISITION:** NOAA requests a net decrease of \$57,631,000 for a total of \$2,062,774,000 in the Systems Acquisition sub-program. Highlights include:

**Geostationary Operational Environmental Satellite Systems – R Series:** NOAA requests a planned decrease of \$85,107,000 in the GOES-R Series program. The remaining funding of \$752,784,000 is needed to sustain the instruments, satellite, and launch vehicle activities to ensure the continuity of the GOES-R Series program geostationary observing platforms. The funds will also be used to continue the development activities to maintain the launch schedules for GOES-T and GOES-U. The GOES program, which has provided essential observational data since 1975, supports the National Weather Service (NWS) in forecasting, tracking, and monitoring severe storms. The GOES-R Series constellation will provide observational data continuity through 2036 and significant enhancements to all operational users of geostationary observations. GOES-R Series observations will provide coverage of the western hemisphere from a geostationary orbit, allowing continuous monitoring from the same angle during the detection and tracking of tropical cyclones, volcanic eruptions, fire hot spots, cloud and atmospheric moisture changes, lightning, currents flow dynamics, and atmospheric smoke and dust.

**Jason-3:** NOAA requests a planned decrease of \$170,000 to the Jason-3 program. The Jason-3 satellite was successfully launched from Vandenberg Air Force Base on January 17, 2016. Remaining funding of \$4,357,000 will provide post-launch support and sustainment of the Jason-3 satellite. The satellite will reach its near-polar orbit, 1,336 kilometers (830 miles) above the Earth. Once in orbit and after a six-month commissioning period to test the satellite's instruments, Jason-3 will continue satellite observations of global sea surface height that began in 1992 with the TOPEX/Poseidon mission and continued with Jason-2. Jason-3 will support national and international users of sea surface height measurements and provide data for a variety of other scientific, commercial, and operational applications. This mission will also help NOAA's NWS more accurately forecast the strength of tropical cyclones that threaten U.S. coastal communities. Jason-3 is an international mission in which NOAA is partnering with NASA, the Centre National d'études Spatiales (CNES, the French Space Agency), and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT).

#### JASON-3 BUDGET AUTHORITY IN THOUSANDS

FY 2016 & Prior	\$155,464	FY 2020	\$4,648
FY 2017	\$4,357	FY 2021	\$4,648
FY 2018	\$7,651	CTC	\$4,468
FY 2019	\$5,338	Total*	\$186,754

This profile reflects the PAC budget for the Jason-3 program. The total Jason-3 life cycle cost is \$204,340,000. In FY 2017, NOAA requests a technical adjustment to transfer the operational phase requirements budgeted within the PAC account to support operational functions in the ORF account. See the FY 2017 President's Budget for additional details.

**JPSS:** NOAA requests a decrease of \$21,720,000 in the JPSS program. The remaining \$787,246,000 will allow NOAA to operate and sustain the Suomi National Polar-orbiting Partnership satellite (S-NPP); launch and commission JPSS-1; continue development of the instruments and spacecraft for JPSS-2; and continue operations, maintenance and sustainment of the ground system for the JPSS constellation. NOAA remains committed to building a robust polar orbiting weather satellite program as rapidly as practicable. As such, during FY 2017 NOAA will continue to prioritize meeting the JPSS-1 launch commitment date of no later than Q2 FY 2017 and maintain the accelerated JPSS-2 launch readiness date of Q4 FY 2021. JPSS provides meteorological data

#### GOES-R BUDGET AUTHORITY IN THOUSANDS

FY 2016 & Prior	\$6,952,951	FY 2020	\$214,674
FY 2017	\$752,784	FY 2021	\$148,588
FY 2018	\$518,532	CTC	\$1,226,651
FY 2019	\$335,879	Total*	\$10,150,059

This profile reflects the PAC budget for the GOES-R Series program. The total GOES-R Series life cycle cost is \$10,828,059,000. In FY 2017, NOAA requests a technical adjustment to transfer the operational phase requirements budgeted within the PAC account to support operational functions in the ORF account. See the FY 2017 President's Budget for additional details.



and observations of the atmosphere, ocean, and land for weather forecasting. Data from civilian polar-orbiting satellites are the primary input (approximately 85%) for all Numerical Weather Prediction (NWP) models. JPSS allows for accurate forecasts three to seven days in advance of a severe weather event. These early warnings allow emergency managers and communities to make timely decisions to protect lives and property.

### JPSS BUDGET AUTHORITY IN THOUSANDS

FY 2016 & Prior	\$7,655,445	FY 2020	\$445,082
FY 2017	\$787,246	FY 2021	\$376,061
FY 2018	\$745,777	CTC	\$740,274
FY 2019	\$572,240	Total	\$11,322,125

**Polar Follow On (PFO):** NOAA requests an increase of \$23,000,000 to continue development activities in support of the PFO/JPSS-3 and PFO/JPSS-4 missions. The \$393,000,000 total request will continue the parts procurement, build, and development of the instruments and complete the detailed design for the PFO/JPSS-3 and PFO/JPSS-4 missions. This request also includes a modest investment in an Earth Observing Nanosatellite-Microwave (EON-MW), a risk reduction mission aimed at mitigating the impact of a potential loss of the most critical microwave sounding observations in the event of a launch or instrument failure on JPSS-1. PFO will extend operations of the NOAA polar satellite system through FY 2038, ensuring that NOAA continues to provide accurate and timely weather forecasts and warnings beyond JPSS-2. Continuing support for the polar satellite system will enable scientists and forecasters to monitor and predict weather patterns with greater accuracy and to study long-term trends. Information from polar satellite constellation supports every area of NOAA's mission, including ensuring a Weather-Ready Nation, healthy coasts, resilient coastal communities, and greater preparedness in the face of climate change.

### POLAR FOLLOW-ON BUDGET AUTHORITY IN THOUSANDS

FY 2016 & Prior	\$370,000	FY 2020	\$577,000
FY 2017	\$383,000	FY 2021	\$467,000
FY 2018	\$586,000	CTC	TBD
FY 2019	\$576,000	Total	TBD

### EON-MW BUDGET AUTHORITY IN THOUSANDS

FY 2016 & Prior	\$0	FY 2020	\$2,000
FY 2017	\$10,000	FY 2021	\$2,000
FY 2018	\$8,000	CTC	\$0
FY 2019	\$5,000	Total	\$27,000

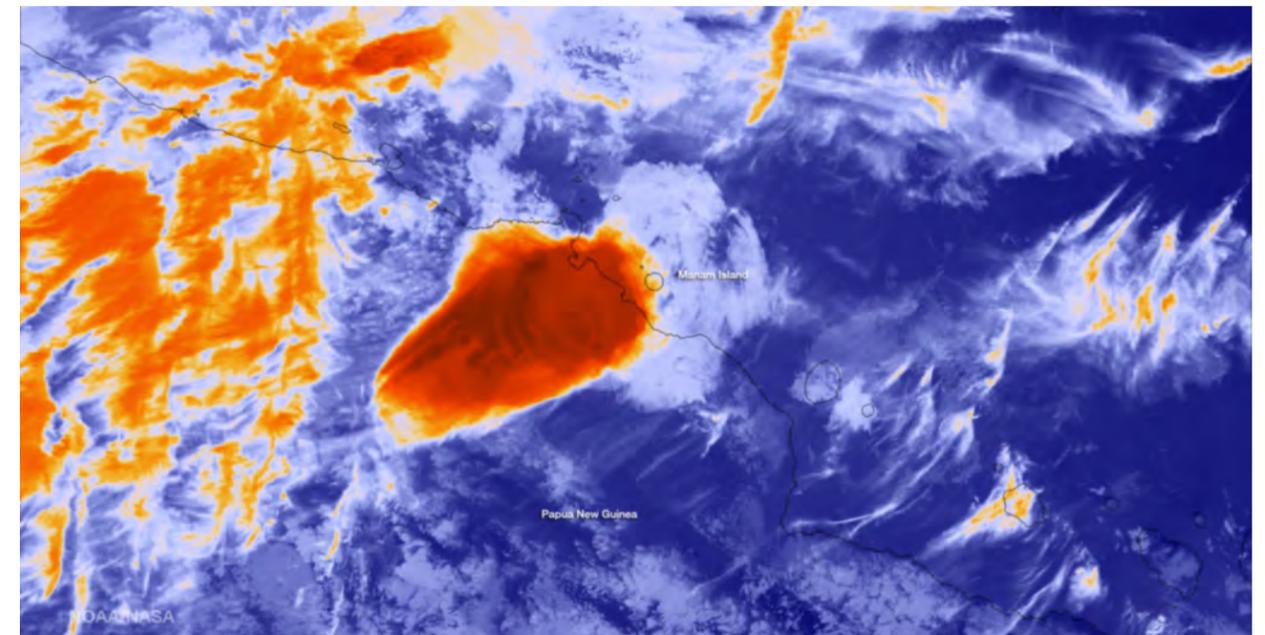
**DSCOVER:** NOAA requests an increase of \$1,453,000 to continue to fund a tech refresh of the NASA-built ground system, anomaly support, and IT security upgrades for the DSCOVER program. The DSCOVER satellite was launched on February 11, 2015. Since its launch, the satellite has had more anomalies than anticipated, which requires additional engineering support from the spacecraft and instrument vendors. Funds requested here will allow NOAA and NASA to respond to anomalies in a timely fashion and return the satellite to operations. Without timely recovery, the NWS Space Weather Prediction Center's ability to provide accurate and early warnings of potentially destructive space weather events will be compromised. These storms can disrupt electrical grids, communications systems, Global Positioning System navigation, air travel, satellite operations, and human spaceflight. This program was developed in partnership with NASA, which refurbished the satellite and developed the ground system, and the U.S. Air Force, which provided the launch services.

### DSCOVER BUDGET AUTHORITY IN THOUSANDS

FY 2016 & Prior	\$100,294	FY 2020	\$3,838
FY 2017	\$3,745	FY 2021	\$3,838
FY 2018	\$3,860	CTC	\$3,838
FY 2019	\$3,838	Total*	\$123,251

\*This profile reflects the PAC budget for the DSCOVER program. The total DSCOVER life cycle cost is \$136,181,000. In FY 2017, NOAA requests a technical adjustment to transfer the operational phase requirements budgeted within the PAC account to support operational functions in the ORF account. See the FY 2017 President's Budget for additional details.

**Space Weather Follow On:** NOAA requests an increase of \$1,300,000 to continue the development of the Space Weather Follow On program. Based upon the FY 2016 Analysis of Alternatives for critical space weather observations, this request will initiate the projects for solar



This image was taken by the Suomi NPP satellite's VIIRS instrument on July 31, 2015. The Suomi NPP VIIRS instrument provides higher resolution imaging with better spatial resolution. Infrared imagery from VIIRS provides information used for volcanic ash advisories which are a serious threat to aviation.

wind data and Coronal Mass Ejection (CME) imagery. CME imagery is the model input for the 1-4 day warning of geomagnetic storm conditions, while solar wind data are the sole input for short-term warnings (15-45 minutes) of geomagnetic storms. NOAA's space based solar wind detection system is operating as a single string constellation, meaning that a loss of DSCOVER, the Nation's operational space weather satellite, would result in a near-term gap in solar wind observations and impact forecasts. This request allows NOAA to pursue a launch and procurement schedule to ensure a Space Weather Follow On will be in place soon after the DSCOVER satellite reaches the end of its projected mission life in FY 2022. This program will consist of two satellites, two launch vehicles, and two sets of sensors: solar wind instruments and compact coronagraphs for CME imaging.

### SPACE WEATHER FOLLOW ON BUDGET AUTHORITY IN THOUSANDS

FY 2016 & Prior	\$1,200	FY 2020	\$154,500
FY 2017	\$2,500	FY 2021	\$81,500
FY 2018	\$53,700	CTC	\$278,200
FY 2019	\$186,100	Total	\$757,700

**Constellation Observing System for Meteorology, Ionosphere and Climate -2 (COSMIC-2)/ Global Navigation Satellite System Radio Occultation (GNSS RO): GNSS RO Ground System:** NOAA requests a planned decrease of \$2,000,000 for ground reception and processing of GNSS RO satellite data. The remaining \$8,100,000 will help complete all IT security testing and verification to support the downlink of GNSS RO data at NOAA. Additionally, the request will support the complete operational testing and validation of the Numerical Weather Prediction Models for COSMIC-2.

### GNSS RO GROUND SYSTEM BUDGET AUTHORITY IN THOUSANDS

FY 2016 & Prior	\$18,897	FY 2020	\$8,100
FY 2017	\$8,100	FY 2021	\$8,100
FY 2018	\$8,100	CTC	\$32,400
FY 2019	\$8,100	Total	\$91,797

**COSMIC-2/ GNSSRO: Polar Orbiting Radio Occultation Data Set:** NOAA requests an increase of \$8,100,000 for the acquisition of additional RO data. NOAA will pursue the acquisition of GNSS RO data in the polar orbit, either through purchase and integration of commercial data or development of a second set of COSMIC-2 sensors. The



equatorial and polar orbits of the constellation will work together to provide global coverage of atmospheric and ionospheric soundings. NWS has determined that increasing the number of RO soundings will result in more accurate long-range weather forecasts. Additionally, the polar orbiting GNSS RO sensors will help mitigate the impacts of a potential gap in sounding data in the polar orbit, including the loss of the ATMS or CrIS instruments on JPSS satellites.

### POLAR ORBITING RO DATA SET

BUDGET AUTHORITY IN THOUSANDS

<b>FY 2016 &amp; Prior</b>	\$0	<b>FY 2020</b>	\$700
<b>FY 2017</b>	\$8,100	<b>FY 2021</b>	\$700
<b>FY 2018</b>	\$8,100	<b>CTC</b>	\$2,800
<b>FY 2019</b>	\$8,300	<b>Total</b>	\$28,700

\*This profile represents the estimated cost for procurement of COSMIC-2B sensors and does not include the costs of launch service to place these sensors in the polar orbit. A profile reflecting the purchase of commercial data rather than procuring COSMIC-2B has not yet been developed. See the FY 2017 President's Budget for additional information.

**Satellite Ground Services: Satellite Ground Services (SGS):** NOAA requests an increase of \$4,525,000 to continue the planning and transition of the independent ground services into a unified set of common ground services for NOAA's environmental satellite systems. The funding request will support deployment of the Enterprise Configuration Management Tool, which will provide an inventory of ground system equipment and allow SGS to identify bulk pricing discounts and trend analysis of equipment failures. Funds will also establish a requirements tracking system to identify capability gaps and performance improvement opportunities across the ground enterprise. These activities are critical to consolidating functions, reducing costs, and setting the foundation for an enterprise ground system.

### SATELLITE GROUND SERVICES

BUDGET AUTHORITY IN THOUSANDS

<b>FY 2016 &amp; Prior</b>	\$104,000	<b>FY 2020</b>	\$57,325
<b>FY 2017</b>	\$57,325	<b>FY 2021</b>	\$57,325
<b>FY 2018</b>	\$57,325	<b>CTC</b>	\$N/A
<b>FY 2019</b>	\$57,325	<b>Total*</b>	Recurring

\*In FY 2017, NOAA requests a technical adjustment to transfer SGS funding to operate and maintain the Wallops, VA backup facility for the NSOF Environmental Satellite Processing Center. See the FY 2017 President's Budget for additional details.

**Satellite Ground Services: DSCOVER Technology Refresh:** NOAA requests an increase of \$1,700,000 to provide a technology refresh of the DSCOVER antenna at the Wallops, Virginia Command and Data Acquisition station. The antenna used to collect data from the DSCOVER satellite is well beyond its useful life and requires a technology refresh. The upgrade will greatly lower the risk of equipment failure and ensure NOAA can continue to collect DSCOVER data from this site. If the antenna fails, the Space Weather Prediction Center may not be able to provide advanced warning of an approaching geomagnetic storm, which can have a significant economic impact on customers in every major public infrastructure system.

### DSCOVER TECH REFRESH

BUDGET AUTHORITY IN THOUSANDS

<b>FY 2016 &amp; Prior</b>	\$0	<b>FY 2020</b>	\$0
<b>FY 2017</b>	\$1700	<b>FY 2021</b>	\$0
<b>FY 2018</b>	\$700	<b>CTC</b>	\$0
<b>FY 2019</b>	\$0	<b>Total</b>	\$2,400

**System Architecture and Advanced Planning (SAAP):** NOAA requests an increase of \$1,000,000 to complete the NOAA Satellite Observing System Architecture (NSOSA) study and supporting grant work. The NSOSA study, which started in FY 2016, will allow SAAP to develop the future architecture of satellite observing systems for meeting weather, space weather, and environmental remote sensing requirements beyond FY 2028. This study will be a joint effort between NOAA and NASA, which will provide science and engineering expertise. The increase will also fund the cooperative institute grant for the Space Platforms Requirements Working Group. This grant will complete the working group's assessment of new and existing requirements against the current satellite architecture, which will allow NOAA to prioritize future satellite observational requirements.

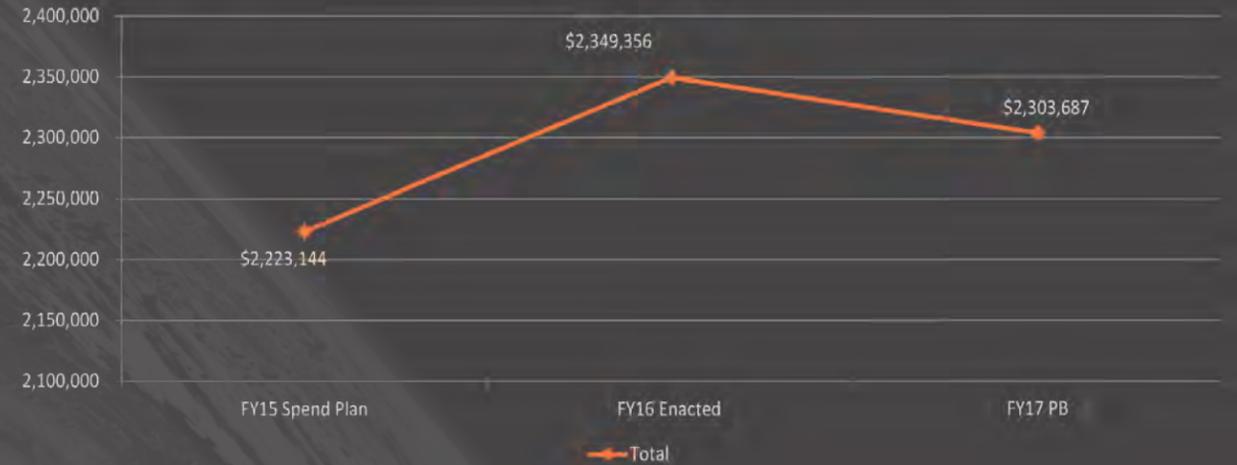
### SAAP

BUDGET AUTHORITY IN THOUSANDS

<b>FY 2016 &amp; Prior</b>	\$6,929	<b>FY 2020</b>	\$4,929
<b>FY 2017</b>	\$4,929	<b>FY 2021</b>	\$4,929
<b>FY 2018</b>	\$4,929	<b>CTC</b>	N/A
<b>FY 2019</b>	\$4,929	<b>Total</b>	Recurring

### NESDIS Discretionary Budget Trends (FY 2015-2017)

(\$ thousands)



**Projects, Planning and Analysis:** NOAA requests an increase of \$8,288,000 to support the accommodation of NOAA instruments on the European satellite MetOp-C for launch in early FY 2019. MetOp-C will provide EUMETSAT and NOAA with polar observations in the mid-morning orbit, similar to the polar observations that JPSS will provide in the afternoon orbit. NOAA is currently preparing three critical instruments for launch on MetOp-C: Advanced Very High Resolution Radiometer; Advanced Microwave Sounding Unit-A; and Space Environment Monitor. FY 2017 funds will allow the Projects, Planning, and Analysis program to evaluate the instrument's performance in the thermal vacuum test, a critical milestone to meeting the MetOp-C launch schedule. This funding request is critical to meeting NOAA obligations to its partnership with EUMETSAT.

**Commercial Weather Data Pilot:** NOAA requests an increase of \$2,000,000 to assess the potential viability of using commercial data in NOAA's weather modeling and forecasting through pilot purchases of commercial data. This request will fund ongoing efforts to evaluate, calibrate and purchase available commercial satellite data, consistent with NOAA's Commercial Space Policy. The Commercial Weather Data Pilot will provide test case examples of commercial providers' ability to deliver data to meet NOAA's observational requirements. NOAA is committed to using commercial space products in its warnings, forecasts, and products, where viable and appropriate, in order to promote a robust commercial space industry and acquire observation data in a cost effective manner.

### PPA

BUDGET AUTHORITY IN THOUSANDS

<b>FY 2016 &amp; Prior</b>	\$50,400	<b>FY 2020</b>	\$33,488
<b>FY 2017</b>	\$33,488	<b>FY 2021</b>	\$33,488
<b>FY 2018</b>	\$33,488	<b>CTC</b>	N/A
<b>FY 2019</b>	\$33,488	<b>Total</b>	Recurring

### COMMERCIAL WEATHER DATA PILOT

BUDGET AUTHORITY IN THOUSANDS

<b>FY 2016 &amp; Prior</b>	\$3,000	<b>FY 2017</b>	\$5,000
Remainder to be provided with FY 2018 President's Budget			



# CHAPTER 7 MISSION SUPPORT

NOAA's Gulfstream IV-SP (front) and Lockheed WP-3D Orions play a major role in tropical cyclone research and forecasting, along with other environmental observation missions.

**NOAA's** Mission Support services (formerly called "Program Support") are the backbone of NOAA's programs and mission. These services provide the planning, administrative, financial, procurement, information technology (IT), human resources, and infrastructure support that are essential to the efficient and effective execution of NOAA's mission. To support the Department of Commerce's Operational Excellence priority, NOAA will begin transitioning its mission services to the shared services model, a new Department-wide customer-focused, service delivery model that will increase efficiencies related to acquisitions, financial management, human resources, and information technology services. Specifically, in FY 2017, following transition of some services in FY 2016, NOAA will continue to develop human resources functions under the shared services model and start to transition acquisitions and information technology services as well. The goal of shared services is to strengthen mission delivery and improve customer service.

## FY 2017 REQUEST \$286,065,000

In FY 2017, NOAA requests a total of \$286,065,000 to position NOAA's Mission Support for more effective execution of NOAA's diverse mission. This total includes Operations, Research, and Facilities (ORF) and Procurement, Acquisition, and Construction (PAC) accounts and reflects a net increase of \$3,494,000 in FY 2017 program changes. In FY 2017, NOAA proposes to rename its Program Support budget program to Mission Support since the functions carried out through these programs are vital to NOAA's environmental stewardship and public safety missions. NOAA proposes a corresponding restructure of the Programs, Projects, and Activities (PPA) within the Mission Support ORF account. This restructure involves simplifying the presentation within the control table and other exhibits by removing line item designations and aligning sub-programs directly with remaining PPAs. The Under Secretary and Associates Office PPA will be renamed Executive Leadership. The NOAA Wide Corporate Services and Agency Management Base, NOAA Facility Management & Construction and Safety, and DOC Accounting System PPAs will be combined into a new Mission Services and Management PPA. As part of this restructure, the Office of Marine and Aviation Operations will become its own budget program and will no longer be part of the Mission Support budget program to reflect its status as an independent line office.

NOAA proposes five sub-programs/PPAs in the restructuring of the ORF account:

- Executive Leadership
- IT Security
- Office of Education
- Mission Services and Management
- Payment to the DOC Working Capital Fund

## FY 2017 ORF BUDGET SUMMARY

NOAA requests a total of \$281,508,000 to support the Operations, Research, and Facilities of Mission Support. This includes a net decrease of \$63,000 in FY 2017 program changes.

### ORF PROGRAM CHANGE HIGHLIGHTS FOR FY 2017:

Program changes above \$1,000,000 are highlighted below. A summary of funding by Program, Project, and Activity (PPA) is located in Appendix 2. Detailed descriptions of all program changes by PPA are located in the NOAA FY 2017 Congressional Justification.

### EXECUTIVE LEADERSHIP \$27,266,000

NOAA requests a total of \$27,266,000 under the Executive Leadership sub-program. There are no program changes in this sub-program.

## MISSION SERVICES AND MANAGEMENT \$155,199,000

NOAA requests a net increase of \$7,842,000 in FY 2017 program changes for a total of \$155,199,000 in the Mission Services and Management sub-program. Highlights include:

**Re-Architecting Data Systems for Mission Resilience:** NOAA requests an increase of \$1,400,000 to improve data flow resiliency across NOAA's critical IT systems and infrastructure. This initiative, which complements the "NESDIS IT Security" proposals described on p. 32 and p. 33 in Chapter 6, will begin modernizing and streamlining NOAA's IT systems. The OCIO component of this request will begin assessment and implementation of robust enterprise architecture to reduce the severity of disruption of the flow of critical NOAA data (e.g., weather forecasts and warnings) in the event that IT systems are compromised or fail. This NOAA-wide re-architecting effort will map specific system linkages, document in-



NOAA's Satellite Operations Facility in Suitland, MD. Home of NOAA's around-the-clock environmental satellite services to provide critical data for weather and climate prediction.

terdependencies, and record configurations for systems that support NOAA's Primary Mission Essential Functions. These efforts are expected to reduce labor and other costs related to NOAA's IT systems over the long term, as well as enhance system resilience and cybersecurity.

**Building Capacity to Provide NOAA-Wide Mission Support:**

NOAA requests an increase of \$4,375,000 to improve oversight, guidance, and administrative operations and services that support NOAA's core mission areas, specifically in human resources and acquisition management. These additional funds are necessary both to support NOAA's retained mission support functions, which have been chronically underfunded for years, as well as to transform from NOAA's current service delivery model to a shared services model whereby a shared service provider will be responsible for transactional tasks (e.g., development of position descriptions and job announcements). This new model will increase efficient delivery of high-quality services; improve performance management and transparency of decision making; and increase NOAA's ability to focus on its mission by freeing bureau employees from routine, transactional tasks. In order to successfully transition the transactional functions to the shared services model, NOAA needs additional funding. The transition will require additional funding for the first few years; costs are expected to decrease in future years.

**Accelerate NOAA Facility Disposal:** NOAA requests an increase of \$2,067,000 to dispose of unneeded facilities and structures in order to reduce the NOAA footprint and optimize the facility portfolio. NOAA operates and manages a large and geographically dispersed facility portfolio with scarce resources, and therefore requires additional funds to transform the portfolio into a modern system of the right type and size in the right places to carry out NOAA's science missions. Disposing of unneeded facilities is a critical step in transforming the portfolio and building the foundation for 21st century science.

**IT SECURITY \$10,050,000**

NOAA requests a total of \$10,050,000 under the IT Security sub-program. There are no program changes in this sub-program.

**PAYMENT TO DOCWORKING CAPITAL FUND \$72,512,000**

NOAA requests a net increase of \$2,295,000 in FY 2017 program changes for a total of \$72,512,000 in the Payment to the DOC Working Capital Fund sub-program.

**Maintaining Capability in the DOC Working Capital Fund:** NOAA requests an increase of \$2,295,000 to cover additional shared service investments within the Departmental Working Capital Fund (WCF). These Departmental requirements include necessary investments in DOC-wide systems, network security initiatives, and replacement of degrading IT infrastructure. A full discussion of all WCF program changes is in the WCF section of the Departmental Management Congressional Submission document.

**OFFICE OF EDUCATION \$16,481,000**

NOAA requests a net decrease of \$10,200,000 in FY 2017 program changes for a total of \$16,481,000 in the Office of Education sub-program. (Within this funding, NOAA will use \$2,050,000 for Office of Education operations and \$14,431,000 to support the Educational Partnership Program.) Highlights include:

**Office of Education:** NOAA requests a decrease of \$3,000,000 to terminate NOAA's Competitive Education Grants program.

**NOAA Bay-Watershed Education and Training (B-WET) Regional Programs:** NOAA requests a decrease of \$7,200,000 to terminate the Bay-Watershed Education and Training (B-WET) Program. In FY 2017, NOAA will continue to provide watershed educational experiences for students through other programs, including National Marine Sanctuaries and the National Estuarine Research Reserves.

**FY 2017 PAC BUDGET SUMMARY**

NOAA requests a total of \$4,557,000 to support the Procurement, Acquisition, and Construction functions of Mission Support. This includes a net increase of \$3,557,000 in FY 2017 program changes.

**MS Discretionary Budget Trends (FY 2015-2017)**  
(\$ thousands)



In the ocean acidification laboratory at the NOAA Mukilteo Research Station, Dr. Paul McElhany demonstrates the functionality of the equipment that exposes California Current species to ocean acidification, temperature change, and deoxygenation treatments.

**National Marine Fisheries Service Facilities Initiative:** NOAA requests \$4,557,000 to prepare for the replacement of the Northwest Fisheries Science Center facility in Mukilteo, Washington (on Puget Sound), which conducts critical research on marine species and the impacts of ecosystem stressors, such as ocean acidification and marine diseases, that contributes to fisheries management decisions. The structural condition of the facility, which was built in the 1940s and was formerly owned by the Department of Defense, has deteriorated to the point that it poses an imminent safety risk to NOAA personnel, threatening NOAA's mission and operations in the region. Condition assessments confirm that NOAA cannot use the facility in its current state for more than five years.

**NOAA FISHERIES FACILITIES INITIATIVE**  
BUDGET AUTHORITY IN THOUSANDS

FY 2017	\$4,557	FY 2020	\$0
FY 2018	\$28,384	FY 2021	\$0
FY 2019	\$0		

**Naval Station Newport Pier Study:** NOAA requests a decrease of \$1,000,000 for completion of a planning and design study related to the evaluation of the NAVSTA Newport pier as a potential homeport for the fisheries survey vessel (FSV) *Henry B. Bigelow*.

**NAVAL STATION NEWPORT PIER STUDY**  
BUDGET AUTHORITY IN THOUSANDS

FY 2017	\$0	FY 2020	\$0
FY 2018	\$0	FY 2021	\$0
FY 2019	\$0		

**PAC PROGRAM CHANGE HIGHLIGHTS FOR FY 2017**

Program changes above \$1,000,000 are highlighted below. A summary of funding by Program, Project, and Activity (PPA) is located in Appendix 2. Detailed descriptions of all program changes by PPA are located in the NOAA FY 2017 Congressional Justification.

**CONSTRUCTION \$3,557,000**

NOAA requests a net increase of \$3,557,000 in FY 2017 program changes for a total of \$4,557,000 in the Construction sub-program. Highlights include:



# CHAPTER 8 OFFICE OF MARINE AND AVIATION OPERATIONS



NOAA Ship Reuben Lasker underway in Alaska. Credit: LCDR Chris Skapin.

**NOAA's** Office of Marine and Aviation Operations (OMAO) supports an array of specialized ships and aircraft that gather oceanographic, atmospheric, hydrographic, and fisheries data in support of NOAA's public safety, environmental stewardship, and scientific missions and vital to the nation's economic security. OMAO includes civilians, mariners, and officers of the NOAA Commissioned Officer Corps, one of the seven uniformed services of the United States. OMAO civilians and NOAA Corps officers operate, manage, and maintain NOAA's active fleet of 16 research and survey ships and nine specialized aircrafts.

## FY 2017 REQUEST \$289,298,000

NOAA requests a total of \$289,298,000 in mandatory and discretionary funds to support the continued and enhanced operations of OMAO, and specifically, to ensure the continuity of NOAA's at-sea data collection capability through continued recapitalization and sustainment of NOAA's ship fleet. This total includes Operations, Research, and Facilities (ORF); Procurement, Acquisition, and Construction (PAC); and other accounts. It also includes a net decrease of \$49,050,000 in FY 2017 program changes. Without these and future investments, the NOAA ship fleet will decline by 50 percent – from 16 to 8 active ships – over the next 10 to 12 years, hampering a number of NOAA missions.



The NOAA aircraft fleet at NOAA's Aircraft Operations Center in Tampa, Florida

## FY 2017 ORF BUDGET SUMMARY

NOAA requests a total of \$217,287,000 to support the Operations, Research, and Facilities activities of OMAO. This includes a net increase of \$2,000,000 in FY 2017 program changes.

### ORF PROGRAM CHANGE HIGHLIGHTS FOR FY 2017:

Program changes above \$1,000,000 are highlighted below. A summary of funding by Program, Project, and Activity (PPA) is located in Appendix 2. Detailed descriptions of all program changes by PPA are located in the NOAA FY 2017 Congressional Justification.

### MARINE OPERATIONS & MAINTENANCE \$184,376,000

NOAA requests a net increase of \$2,000,000 for a total of \$184,376,000 in the Marine Operations and Maintenance sub-program. Highlights include:

**Marine Operations & Maintenance: Alternative Crew Models:** NOAA requests an increase of \$2,000,000 to support a pilot program for alternative crewing on NOAA ships. These funds are needed to test alternatives to current ship staffing that will prevent loss of Days at Sea (DAS) due to crewing constraints. NOAA faces a maritime industry-wide problem of high demand and intense competition for a small pool of qualified mariners. Currently, if a qualified replacement engineer is not available when NOAA must conduct an at-sea mission, it can result in lost DAS. With the requested increase, NOAA will expand the rotational staffing program for licensed engineering officers on approximately twelve NOAA ships. NOAA will also begin piloting rotational staffing for unlicensed engine, deck, steward, and survey departments on two ships. Implementing the rotational staffing program will increase the number of DAS available for allocation to NOAA's prioritized mission needs.

## AVIATION OPERATIONS \$32,911,000

NOAA requests a total of \$32,911,000 in the Aviation Operations sub-program. There are no program changes in this sub-program.

## FY 2017 PAC BUDGET SUMMARY

NOAA requests a total of \$24,000,000 to support the Procurement, Acquisition, and Construction functions of OMAO. This includes a net decrease of \$51,050,000 in FY 2017 program changes.

### PAC PROGRAM CHANGE HIGHLIGHTS FOR FY 2017:

Program changes above \$1,000,000 are highlighted below. A summary of funding by Program, Project, and Activity (PPA) is located in Appendix 2. Detailed descriptions of all program changes by PPA are located in the NOAA FY 2017 Congressional Justification.

## OMAO FLEET REPLACEMENT \$40,700,000

NOAA requests a net decrease of \$51,050,000 in FY 2017 program changes for a total of \$40,700,000 in the OMAO Fleet Replacement sub-program. Highlights include:

### New Vessel Construction: Fleet Recapitalization:

NOAA requests a net decrease of \$56,050,000 in this PPA in FY 2017. NOAA will use the \$80,050,000 provided in FY 2016 for this program along with the \$24,000,000 remaining in FY 2017 to complete design, acquisition and construction of a Regional Survey Vessel (RSV) as part of a multi-year NOAA ship fleet recapitalization initiative. NOAA's fleet is aging, with half of its vessels scheduled to retire within the next 10-12 years. Both regional-class

vessels and ocean-class survey vessels (OSV) will be decommissioned during this time frame. NOAA's fleet replacement plan previously identified replacing the RSVs as its highest priority, with three regional-class vessels recently retired and two additional ships retiring in the next seven years. Due to an opportunity to leverage Navy's expertise, NOAA decided to develop and build an OSV first. However, cost, schedule, and a reassessment of NOAA's highest priority data collection needs prevented this idea from advancing beyond the design stage. Given these challenges, NOAA, in conjunction with other Federal oceanographic research agencies, re-examined its broad fleet needs, as well as government-wide fleet capacity, and determined that a smarter strategy is to invest in RSVs, which can perform many NOAA mission-critical activities and have lower acquisition and operations and maintenance costs than the OSV. Investment in an OSV has been shifted to a later date.

## NEW VESSEL CONSTRUCTION

BUDGET AUTHORITY IN THOUSANDS

FY 2017	\$24,000	FY 2020	TBD
FY 2018	TBD	FY 2021	TBD
FY 2019	TBD		

**Fleet Capital Improvements and Technology Infusion: Progressive Lifecycle Maintenance:** NOAA requests an increase of \$5,000,000 to support the Progressive Lifecycle Maintenance Program. Funds will stabilize capital investment in regular upgrades and replacements of fleet equipment and technology infusions, such as data processing capacity. This investment will help ensure the continuity and reliability – and extend the service life – of the NOAA fleet to support the agency's diverse at-sea observation and data collection needs.

## FLEET CAPITAL IMPROVEMENTS & TECH INFUSION

BUDGET AUTHORITY IN THOUSANDS

FY 2017	\$16,700	FY 2020	\$16,700
FY 2018	\$16,700	FY 2021	\$16,700
FY 2019	\$16,700		



The crew of NOAA Ship Henry B. Bigelow on the ship's bridge. Credit: David Hall.

## OMAO Discretionary Budget Trends (FY 2015-2017)

(\$ thousands)



## DISCRETIONARY FUNDS

### MEDICARE-ELIGIBLE RETIREE HEALTHCARE FUND CONTRIBUTION

The FY 2003 Department of Defense Authorization Act 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. FY17 payments to the accrual fund are estimated to be \$1,936,000.

## MANDATORY FUNDS

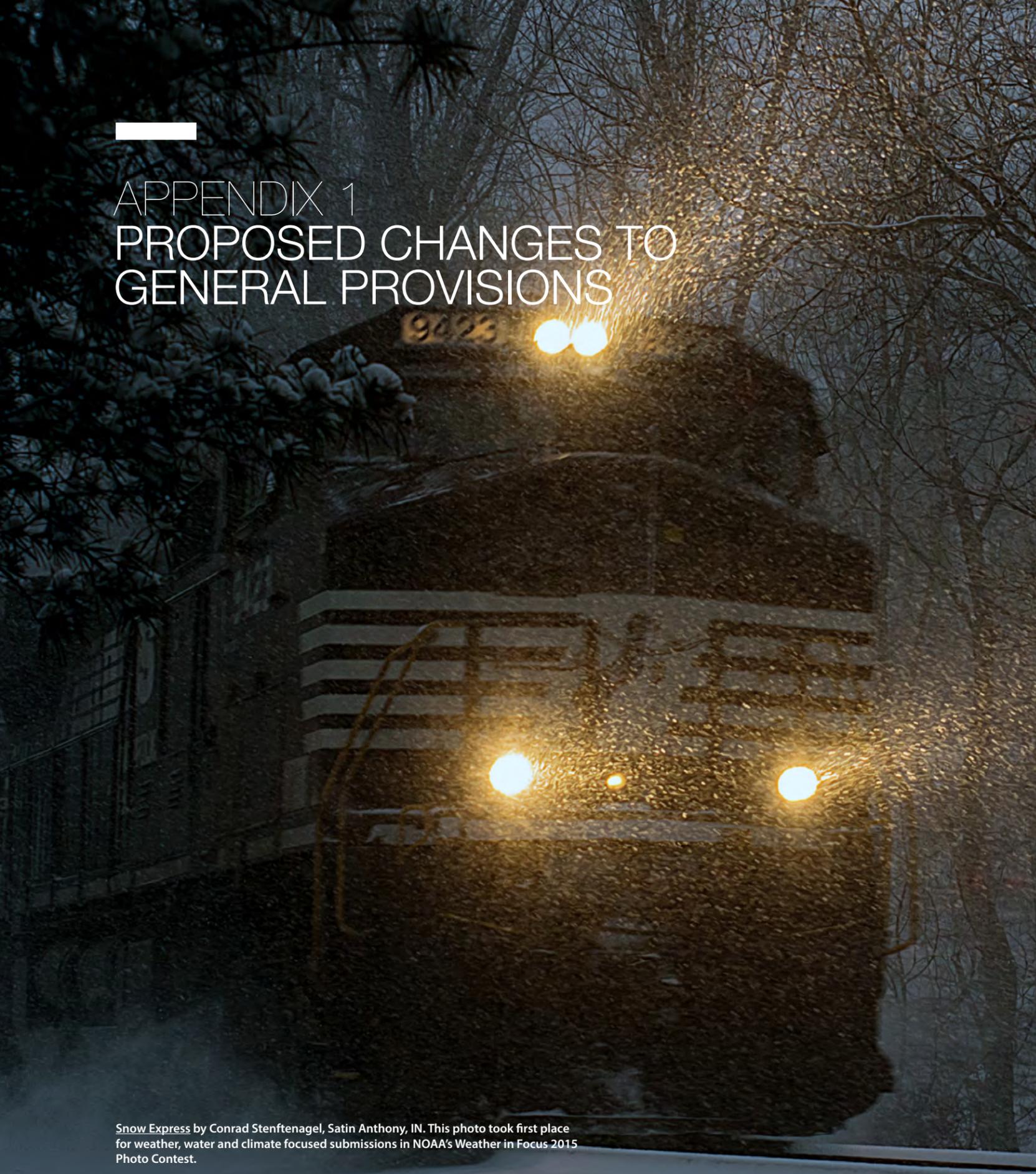
### NOAA CORPS COMMISSIONED OFFICERS RETIREMENT

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 is mandated by Federal statutes

under Title 10, United States Code. NOAA transfers retirement pay funds to the Coast Guard, which handles the payment function for retirees and annuitants. Health care funds for non-Medicare-eligible retirees, dependents, and annuitants are transferred to the U.S. Public Health Service, which administers the health care program.

### RECAPITALIZED RESEARCH FLEET

In addition to the aforementioned \$24,000,000 request in discretionary funds for a regional survey vessel (RSV) for OMAO, the Budget includes \$100,000,000 in mandatory funds to begin construction on a second RSV as part of a multi-year NOAA ship fleet recapitalization initiative.



# APPENDIX 1 PROPOSED CHANGES TO GENERAL PROVISIONS

NOAA seeks the following changes to the General Provisions in its FY 2017 budget submission. For a more detailed discussion of the justification for these proposed changes, please consult the FY 2017 Congressional Justification.

## 1. NOAA Cost Recovery Language

SEC. 110. To carry out the responsibilities of the National Oceanic and Atmospheric Administration (NOAA), the Administrator of NOAA is authorized to: (1) enter into grants and cooperative agreements with; (2) use on a non-reimbursable basis land, services, equipment, personnel, and facilities provided by; and (3) receive and expend funds made available on a consensual basis from: a Federal agency, State or subdivision thereof, local government, tribal government, territory, or possession or any subdivisions thereof, foreign government, international or intergovernmental organization, public or private organization, or individual: Provided, That funds received for permitting and related regulatory activities pursuant to this section shall be deposited under the heading “National Oceanic and Atmospheric Administration—Operations, Research, and Facilities” and shall remain available until expended for such purposes: Provided further, That all funds within this section and their corresponding uses are subject to section 505 of this Act.

### Justification

NOAA proposes to clarify NOAA's ability to receive and expend funds from, and to engage in agreements with, external entities to carry out its responsibilities. These activities include, but are not limited to, scientific data collection and research that informs NOAA's decisions and utilization of land and facilities to support NOAA's research and operational activities.

*Snow Express* by Conrad Stenftenagel, Satin Anthony, IN. This photo took first place for weather, water and climate focused submissions in NOAA's Weather in Focus 2015 Photo Contest.

# APPENDIX 2 CONTROL TABLE

## NATIONAL OCEAN SERVICE All \$ in Thousands

FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
<b>Navigation, Observations and Positioning</b>						
Navigation, Observations and Positioning	137,961	149,000	2,406	151,406	(8,000)	143,406
Hydrographic Survey Priorities/Contracts	25,000	27,000	0	27,000	(2,000)	25,000
IOOS Regional Observations	29,500	29,500	0	29,500	0	29,500
<b>Total, Navigation, Observations and Positioning</b>	<b>192,461</b>	<b>205,500</b>	<b>2,406</b>	<b>207,906</b>	<b>(10,000)</b>	<b>197,906</b>
<b>Coastal Science and Assessment</b>						
Coastal Science, Assessment, Response and Restoration	71,000	72,600	1,512	74,112	0	74,112
Competitive Research	9,000	9,000	0	9,000	4,000	13,000
<b>Total, Coastal Science and Assessment</b>	<b>80,000</b>	<b>81,600</b>	<b>1,512</b>	<b>83,112</b>	<b>4,000</b>	<b>87,112</b>
<b>Ocean and Coastal Management and Services</b>						
Coastal Zone Management and Services	41,700	40,000	341	40,341	13,506	53,847
Coastal Management Grants	71,146	75,000	0	75,000	15,646	90,646
Coral Reef Program	26,000	26,000	100	26,100	0	26,100
National Estuarine Research Reserve System	21,300	23,000	0	23,000	0	23,000
Sanctuaries and Marine Protected Areas	48,500	49,000	800	49,800	0	49,800
<b>Total, Ocean and Coastal Management and Services</b>	<b>208,646</b>	<b>213,000</b>	<b>1,241</b>	<b>214,241</b>	<b>29,152</b>	<b>243,393</b>
<b>Total, National Ocean Service - ORF</b>	<b>481,107</b>	<b>500,100</b>	<b>5,159</b>	<b>505,259</b>	<b>23,152</b>	<b>528,411</b>
<b>Other National Ocean Service Accounts</b>						
Total, National Ocean Service - PAC	3,700	3,700	0	3,700	0	3,700
Total, National Ocean Service - Other	50,931	98,047	(70,243)	27,804	10,000	37,804
<b>GRAND TOTAL NOS</b>	<b>535,738</b>	<b>601,847</b>	<b>(65,084)</b>	<b>536,763</b>	<b>33,152</b>	<b>569,915</b>

## NATIONAL MARINE FISHERIES SERVICE All \$ in Thousands

FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
<b>Protected Resources Science and Management</b>						
Marine Mammals, Sea Turtles & Other Species	110,219	110,246	1,409	111,655	13,452	125,107
Species Recovery Grants	5,000	6,000	8	6,008	16,012	22,020
Atlantic Salmon	5,500	6,163	61	6,224	0	6,224
Pacific Salmon	60,000	60,000	1,082	61,082	2,338	63,420
<b>Total, Protected Resources Science and Management</b>	<b>180,719</b>	<b>182,409</b>	<b>2,560</b>	<b>184,969</b>	<b>31,802</b>	<b>216,771</b>
<b>Fisheries Science and Management</b>						
Fisheries and Ecosystem Science Programs and Services	132,189	139,489	3,872	143,361	6,808	150,169
Fisheries Data Collections, Surveys and Assessments	158,271	163,271	1,478	164,749	0	164,749
Observers and Training	43,655	43,655	403	44,058	1,095	45,153
Fisheries Management Programs and Services	114,758	115,995	1,839	117,834	4,061	121,895
Aquaculture	5,700	6,300	81	6,381	1,525	7,906
Salmon Management Activities	30,200	31,500	85	31,585	0	31,585
Regional Councils and Fisheries Commissions	32,738	33,470	784	34,254	0	34,254
Interjurisdictional Fisheries Grants	2,500	3,000	4	3,004	0	3,004
<b>Total, Fisheries Science and Management</b>	<b>520,011</b>	<b>536,680</b>	<b>8,546</b>	<b>545,226</b>	<b>13,489</b>	<b>558,715</b>
<b>Enforcement</b>						
Enforcement	65,000	69,000	840	69,840	1,018	70,858
<b>Total, Enforcement</b>	<b>65,000</b>	<b>69,000</b>	<b>840</b>	<b>69,840</b>	<b>1,018</b>	<b>70,858</b>
<b>Habitat Conservation and Restoration</b>						
Habitat Conservation and Restoration	56,408	61,408	505	61,913	(3,523)	58,390
<b>Subtotal, Habitat Conservation &amp; Restoration</b>	<b>56,408</b>	<b>61,408</b>	<b>505</b>	<b>61,913</b>	<b>(3,523)</b>	<b>58,390</b>
<b>Total, National Marine Fisheries Service - ORF</b>	<b>822,138</b>	<b>849,497</b>	<b>12,451</b>	<b>861,948</b>	<b>42,786</b>	<b>904,734</b>
<b>Other National Marine Fisheries Service Accounts</b>						
Total, National Marine Fisheries Service - PAC	0	0	0	0	0	0
Total, National Marine Fisheries Service - Other	136,056	122,206	(20,010)	102,196	9,000	111,196
<b>GRAND TOTAL NMFS</b>	<b>958,194</b>	<b>971,703</b>	<b>(7,559)</b>	<b>964,144</b>	<b>51,786</b>	<b>1,015,930</b>



## OFFICE OF OCEANIC AND ATMOSPHERIC RESEARCH All \$ in Thousands

FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
<b>Climate Research</b>						
<b>Laboratories &amp; Cooperative Institutes</b>						
Laboratories & Cooperative Institutes	60,000	60,000	420	60,420	10,493	70,913
<b>Subtotal, Laboratories &amp; Cooperative Institutes</b>	<b>60,000</b>	<b>60,000</b>	<b>420</b>	<b>60,420</b>	<b>10,493</b>	<b>70,913</b>
<b>Regional Climate Data &amp; Information</b>						
Regional Climate Data & Information	38,000	38,000	266	38,266	14,437	52,703
<b>Subtotal, Regional Climate Data &amp; Information</b>	<b>38,000</b>	<b>38,000</b>	<b>266</b>	<b>38,266</b>	<b>14,437</b>	<b>52,703</b>
<b>Climate Competitive Research</b>						
Climate Competitive Research	60,000	60,000	420	60,420	5,830	66,250
<b>Subtotal, Climate Competitive Research</b>	<b>60,000</b>	<b>60,000</b>	<b>420</b>	<b>60,420</b>	<b>5,830</b>	<b>66,250</b>
<b>Total, Climate Research</b>	<b>158,000</b>	<b>158,000</b>	<b>1,106</b>	<b>159,106</b>	<b>30,760</b>	<b>189,866</b>
<b>Weather &amp; Air Chemistry Research</b>						
<b>Laboratories &amp; Cooperative Institutes</b>						
Laboratories & Cooperative Institutes	70,000	76,000	4,549	80,549	(7,896)	72,653
<b>Subtotal, Laboratories &amp; Cooperative Institutes</b>	<b>70,000</b>	<b>76,000</b>	<b>4,549</b>	<b>80,549</b>	<b>(7,896)</b>	<b>72,653</b>
<b>Weather &amp; Air Chemistry Research Programs</b>						
U.S. Weather Research Program (USWRP)	7,300	8,000	56	8,056	8,078	16,134
Tornado Severe Storm Research / Phased Array Radar	13,500	13,158	0	13,158	0	13,158
Joint Technology Transfer Initiative	0	6,000	0	6,000	(6,000)	0
<b>Subtotal, Weather &amp; Air Chemistry Research Programs</b>	<b>20,800</b>	<b>27,158</b>	<b>56</b>	<b>27,214</b>	<b>2,078</b>	<b>29,292</b>
<b>Total, Weather &amp; Air Chemistry Research</b>	<b>90,800</b>	<b>103,158</b>	<b>4,605</b>	<b>107,763</b>	<b>(5,818)</b>	<b>101,945</b>
<b>Ocean, Coastal, and Great Lakes Research</b>						
<b>Laboratories &amp; Cooperative Institutes</b>						
Laboratories & Cooperative Institutes	27,000	32,000	374	32,374	(4,985)	27,389
<b>Subtotal, Laboratories &amp; Cooperative Institutes</b>	<b>27,000</b>	<b>32,000</b>	<b>374</b>	<b>32,374</b>	<b>(4,985)</b>	<b>27,389</b>
<b>National Sea Grant College Program</b>						
National Sea Grant College Program Base	62,800	64,000	448	64,448	(2,548)	61,900
Marine Aquaculture Program	4,500	9,000	0	9,000	(2,000)	7,000
<b>Subtotal, National Sea Grant College Program</b>	<b>67,300</b>	<b>73,000</b>	<b>448</b>	<b>73,448</b>	<b>(4,548)</b>	<b>68,900</b>

FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
<b>Ocean Exploration and Research</b>						
Ocean Exploration and Research	28,000	32,000	224	32,224	(12,656)	19,568
<b>Subtotal, Ocean Exploration and Research</b>	<b>28,000</b>	<b>32,000</b>	<b>224</b>	<b>32,224</b>	<b>(12,656)</b>	<b>19,568</b>
<b>Other Ecosystems Programs</b>						
Integrated Ocean Acidification	8,500	10,000	70	10,070	11,705	21,775
<b>Subtotal, Other Ecosystems Programs</b>	<b>8,500</b>	<b>10,000</b>	<b>70</b>	<b>10,070</b>	<b>11,705</b>	<b>21,775</b>
<b>Sustained Ocean Observations and Monitoring</b>						
Sustained Ocean Observations and Monitoring	41,300	41,596	227	41,823	0	41,823
<b>Subtotal, Sustained Ocean Observations and Monitoring</b>	<b>41,300</b>	<b>41,596</b>	<b>227</b>	<b>41,823</b>	<b>0</b>	<b>41,823</b>
<b>Total, Ocean, Coastal, &amp; Great Lakes Research</b>	<b>172,100</b>	<b>188,596</b>	<b>1,343</b>	<b>189,939</b>	<b>(10,484)</b>	<b>179,455</b>
<b>Innovative Research &amp; Technology</b>						
High Performance Computing Initiatives	12,000	12,144	0	12,144	0	12,144
Research Transition Acceleration Program	0	0	0	0	10,000	10,000
<b>Total, Innovative Research &amp; Technology</b>	<b>12,000</b>	<b>12,144</b>	<b>0</b>	<b>12,144</b>	<b>10,000</b>	<b>22,144</b>
<b>Total, Office of Oceanic and Atmospheric Research - ORF</b>	<b>432,900</b>	<b>461,898</b>	<b>7,054</b>	<b>468,952</b>	<b>24,458</b>	<b>493,410</b>
<b>Other Office of Oceanic and Atmospheric Research Accounts</b>						
Total, Office of Ocean and Atmospheric Research - PAC	13,379	20,079	0	20,079	6,300	26,379
Total, Office of Oceanic and Atmospheric Research - Other	0	0	0	0	0	0
<b>GRAND TOTAL OAR</b>	<b>446,279</b>	<b>481,977</b>	<b>7,054</b>	<b>489,031</b>	<b>30,758</b>	<b>519,789</b>



## NATIONAL WEATHER SERVICE All \$ in Thousands

FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
Observations	197,977	216,363	18,120	234,483	(11,487)	222,996
Central Processing	96,617	92,871	486	93,357	(4,969)	88,388
Analyze, Forecast and Support	483,060	496,031	(5,414)	490,617	(4,686)	485,931
Dissemination	52,899	44,743	493	45,236	2,000	47,236
Science and Technology Integration	123,600	138,826	9	138,835	(6,879)	131,956
<b>Total, National Weather Service - ORF</b>	<b>954,153</b>	<b>988,834</b>	<b>13,694</b>	<b>1,002,528</b>	<b>(26,021)</b>	<b>976,507</b>
<b>Other National Weather Service Accounts</b>						
Total, National Weather Service - PAC	133,300	135,315	0	135,315	7,470	142,785
Total, National Weather Service - Other	0	0	0	0	0	0
<b>GRAND TOTAL NWS</b>	<b>1,087,453</b>	<b>1,124,149</b>	<b>13,694</b>	<b>1,137,843</b>	<b>(18,551)</b>	<b>1,119,292</b>

## NATIONAL ENVIRONMENTAL SATELLITE, DATA AND INFORMATION SERVICE All \$ in Thousands

FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
<b>Environmental Satellite Observing Systems</b>						
<b>Office of Satellite and Product Operations (OSPO)</b>						
Satellite and Product Operations	84,000	93,000	25,996	118,996	4,428	123,424
NSOF Operations	8,500	9,000	5,250	14,250	0	14,250
<b>Subtotal, Office of Satellite and Product Operations (OSPO)</b>	<b>92,500</b>	<b>102,000</b>	<b>31,246</b>	<b>133,246</b>	<b>4,428</b>	<b>137,674</b>
<b>Product Development, Readiness &amp; Application</b>						
Product Development, Readiness & Application	26,000	26,000	7,954	33,954	316	34,270
<b>Subtotal, Product Development, Readiness &amp; Application</b>	<b>26,000</b>	<b>26,000</b>	<b>7,954</b>	<b>33,954</b>	<b>316</b>	<b>34,270</b>
Commercial Remote Sensing Regulatory Affairs	1,000	1,000	0	1,000	1,065	2,065
Office of Space Commerce	600	600	0	600	1,400	2,000
Group on Earth Observations (GEO)	500	500	0	500	0	500
<b>Total, Environmental Satellite Observing Systems</b>	<b>120,600</b>	<b>130,100</b>	<b>39,200</b>	<b>169,300</b>	<b>7,209</b>	<b>176,509</b>
<b>National Centers for Environmental Information</b>						
National Centers for Environmental Information	68,000	58,986	3,231	62,217	1,261	63,478
<b>Total, National Centers for Environmental Information</b>	<b>68,000</b>	<b>58,986</b>	<b>3,231</b>	<b>62,217</b>	<b>1,261</b>	<b>63,478</b>
<b>Total, NESDIS - ORF</b>	<b>188,600</b>	<b>189,086</b>	<b>42,431</b>	<b>231,517</b>	<b>8,470</b>	<b>239,987</b>
<b>Other NESDIS Accounts</b>						
Total, NESDIS - PAC	2,034,544	2,160,270	(38,939)	2,121,331	(57,631)	2,063,700
Total, NESDIS - Other	0	0	0	0	0	0
<b>GRAND TOTAL NESDIS</b>	<b>2,223,144</b>	<b>2,349,356</b>	<b>3,492</b>	<b>2,352,848</b>	<b>(49,161)</b>	<b>2,303,687</b>



## MISSION SUPPORT All \$ in Thousands

FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
Executive Leadership	27,000	27,000	266	27,266	0	27,266
Mission Services and Management	145,000	148,000	(643)	147,357	7,842	155,199
IT Security	8,300	8,300	1,750	10,050	0	10,050
Payment to the DOC Working Capital Fund	40,000	43,000	27,217	70,217	2,295	72,512
Office of Education	27,600	26,631	50	26,681	(10,200)	16,481
<b>Total, Mission Support - ORF</b>	<b>247,900</b>	<b>252,931</b>	<b>28,640</b>	<b>281,571</b>	<b>(63)</b>	<b>281,508</b>
<b>Other Mission Support Accounts</b>						
Total, Mission Support - PAC	0	1,000	0	1,000	3,557	4,557
Total, Mission Support - Other	0	0	0	0	0	0
<b>GRAND TOTAL MS</b>	<b>247,900</b>	<b>253,931</b>	<b>28,640</b>	<b>282,571</b>	<b>3,494</b>	<b>286,065</b>

## OFFICE OF MARINE AND AVIATION OPERATIONS All \$ in Thousands

FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
<b>Marine Operations &amp; Maintenance</b>						
Marine Operations & Maintenance	175,000	178,838	3,538	182,376	2,000	184,376
<b>Total, Marine Operations &amp; Maintenance</b>	<b>175,000</b>	<b>178,838</b>	<b>3,538</b>	<b>182,376</b>	<b>2,000</b>	<b>184,376</b>
<b>Aviation Operations</b>						
Aircraft Services	31,600	32,293	618	32,911	0	32,911
<b>Total, Aviation Operations</b>	<b>31,600</b>	<b>32,293</b>	<b>618</b>	<b>32,911</b>	<b>0</b>	<b>32,911</b>
<b>Total, OMAO - ORF</b>	<b>206,600</b>	<b>211,131</b>	<b>4,156</b>	<b>215,287</b>	<b>2,000</b>	<b>217,287</b>
<b>Other OMAO Accounts</b>						
Total, OMAO - PAC	6,000	91,750	0	91,750	(51,050)	40,700
Total, OMAO - Other	30,205	31,311	0	31,311	0	31,311
<b>GRAND TOTAL OMAO</b>	<b>242,805</b>	<b>334,192</b>	<b>4,156</b>	<b>338,348</b>	<b>(49,050)</b>	<b>289,298</b>

## ORF SUMMARY LINE OFFICE DIRECT OBLIGATIONS All \$ in Thousands

FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
National Ocean Service	481,107	500,100	5,159	505,259	23,152	528,411
National Marine Fisheries Service	822,138	849,497	12,451	861,948	42,786	904,734
Office of Oceanic and Atmospheric Research	432,900	461,898	7,054	468,952	24,458	493,410
National Weather Service	954,153	988,834	13,694	1,002,528	(26,021)	976,507
National Environmental Satellite, Data and Information Service	188,600	189,086	42,431	231,517	8,470	239,987
Mission Support	247,900	252,931	28,640	281,571	(63)	281,508
Office of Marine and Aviation Operations	206,600	211,131	4,156	215,287	2,000	217,287
<b>SUBTOTAL LO DIRECT OBLIGATIONS</b>	<b>3,333,398</b>	<b>3,453,477</b>	<b>113,585</b>	<b>3,567,062</b>	<b>74,782</b>	<b>3,641,844</b>

## ORF ADJUSTMENTS All \$ in Thousands

FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
<b>SUBTOTAL LO DIRECT OBLIGATIONS</b>	<b>3,333,398</b>	<b>3,453,477</b>	<b>113,585</b>	<b>3,567,062</b>	<b>74,782</b>	<b>3,641,844</b>
<b>FINANCING</b>						
De-Obligations	(15,000)	(17,500)	0	(17,500)	0	(17,500)
<b>Total ORF Financing</b>	<b>(15,000)</b>	<b>(17,500)</b>	<b>0</b>	<b>(17,500)</b>	<b>0</b>	<b>(17,500)</b>
<b>SUBTOTAL BUDGET AUTHORITY</b>	<b>3,318,398</b>	<b>3,435,977</b>	<b>113,585</b>	<b>3,549,562</b>	<b>74,782</b>	<b>3,624,344</b>
<b>TRANSFERS</b>						
Transfer from P&D to ORF	(116,000)	(130,164)	0	(130,164)	0	(130,164)
<b>Total ORF Transfers</b>	<b>(116,000)</b>	<b>(130,164)</b>	<b>0</b>	<b>(130,164)</b>	<b>0</b>	<b>(130,164)</b>
<b>SUBTOTAL APPROPRIATION</b>	<b>3,202,398</b>	<b>3,305,813</b>	<b>113,585</b>	<b>3,419,398</b>	<b>74,782</b>	<b>3,494,180</b>



## PROCUREMENT, ACQUISITION, AND CONSTRUCTION All \$ in Thousands

FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
<b>NOS</b>						
<b>NERRS Construction</b>						
National Estuarine Research Reserve Construction (NERRS)	1,700	1,700	0	1,700	0	1,700
<b>Subtotal, NERRS Construction</b>	<b>1,700</b>	<b>1,700</b>	<b>0</b>	<b>1,700</b>	<b>0</b>	<b>1,700</b>
<b>Marine Sanctuaries Construction</b>						
Marine Sanctuaries Base	2,000	2,000	0	2,000	0	2,000
<b>Subtotal, Marine Sanctuary Construction</b>	<b>2,000</b>	<b>2,000</b>	<b>0</b>	<b>2,000</b>	<b>0</b>	<b>2,000</b>
<b>Subtotal, NOS Construction</b>	<b>3,700</b>	<b>3,700</b>	<b>0</b>	<b>3,700</b>	<b>0</b>	<b>3,700</b>
<b>Total, NOS - PAC</b>	<b>3,700</b>	<b>3,700</b>	<b>0</b>	<b>3,700</b>	<b>0</b>	<b>3,700</b>
<b>Total, NMFS - PAC</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>OAR</b>						
<b>Systems Acquisition</b>						
Research Supercomputing/ CCRI	13,379	20,079	0	20,079	6,300	26,379
<b>Subtotal, OAR Systems Acquisition</b>	<b>13,379</b>	<b>20,079</b>	<b>0</b>	<b>20,079</b>	<b>6,300</b>	<b>26,379</b>
<b>Total, OAR - PAC</b>	<b>13,379</b>	<b>20,079</b>	<b>0</b>	<b>20,079</b>	<b>6,300</b>	<b>26,379</b>
<b>NWS</b>						
<b>Systems Acquisition</b>						
Observations	12,300	16,720	0	16,720	16,035	32,755
Central Processing	64,000	64,261	0	64,261	2,500	66,761
Dissemination	45,000	45,684	0	45,684	(11,065)	34,619
<b>Subtotal, NWS Systems Acquisition</b>	<b>121,300</b>	<b>126,665</b>	<b>0</b>	<b>126,665</b>	<b>7,470</b>	<b>134,135</b>
<b>Construction</b>						
Facilities Construction and Major Repairs	12,000	8,650	0	8,650	0	8,650
<b>Subtotal, NWS Construction</b>	<b>12,000</b>	<b>8,650</b>	<b>0</b>	<b>8,650</b>	<b>0</b>	<b>8,650</b>
<b>Total, NWS - PAC</b>	<b>133,300</b>	<b>135,315</b>	<b>0</b>	<b>135,315</b>	<b>7,470</b>	<b>142,785</b>

FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
<b>NESDIS</b>						
<b>Systems Acquisition</b>						
Geostationary Systems - R	980,838	871,791	(33,900)	837,891	(85,107)	752,784
Jason-3	23,175	7,458	(2,931)	4,527	(170)	4,357
Joint Polar Satellite System (JPSS)	916,267	808,966	0	808,966	(21,720)	787,246
Polar Follow On	0	370,000	0	370,000	23,000	393,000
Cooperative Data and Rescue Services (CDARS)	7,300	500	0	500	0	500
DSCOVR	21,100	3,200	(908)	2,292	1,453	3,745
Space Weather Follow On	0	1,200	0	1,200	1,300	2,500
COSMIC 2/GNSS RO	6,800	10,100	0	10,100	6,100	16,200
Satellite Ground Services	50,000	54,000	(1,200)	52,800	6,225	59,025
System Architecture and Advanced Planning	3,000	3,929	0	3,929	1,000	4,929
Projects, Planning and Analysis	25,200	25,200	0	25,200	8,288	33,488
Commerical Weather Data Pilot	0	3,000	0	3,000	2,000	5,000
<b>Subtotal, NESDIS Systems Acquisition</b>	<b>2,033,680</b>	<b>2,159,344</b>	<b>(38,939)</b>	<b>2,120,405</b>	<b>(57,631)</b>	<b>2,062,774</b>
<b>Construction</b>						
Satellite CDA Facility	2,166	2,228	0	2,228	0	2,228
<b>Subtotal, NESDIS Construction</b>	<b>2,166</b>	<b>2,228</b>	<b>0</b>	<b>2,228</b>	<b>0</b>	<b>2,228</b>
<b>Transfer to OIG</b>	<b>(1,302)</b>	<b>(1,302)</b>	<b>0</b>	<b>(1,302)</b>	<b>0</b>	<b>(1,302)</b>
<b>Total, NESDIS - PAC</b>	<b>2,034,544</b>	<b>2,160,270</b>	<b>(38,939)</b>	<b>2,121,331</b>	<b>(57,631)</b>	<b>2,063,700</b>
<b>Mission Support</b>						
<b>Construction</b>						
NOAA Construction	0	1,000	0	1,000	3,557	4,557
<b>Subtotal, Construction</b>	<b>0</b>	<b>1,000</b>	<b>0</b>	<b>1,000</b>	<b>3,557</b>	<b>4,557</b>
<b>Total, Mission Support - PAC</b>	<b>0</b>	<b>1,000</b>	<b>0</b>	<b>1,000</b>	<b>3,557</b>	<b>4,557</b>
<b>OMAO</b>						
<b>OMAO - Fleet Replacement</b>						
Fleet Capital Improvements & Tech Infusion (Vessel Equip & Tech Refresh)	6,000	11,700	0	11,700	5,000	16,700
New Vessel Construction	0	80,050	0	80,050	(56,050)	24,000
<b>Subtotal, OMAO Fleet Replacement</b>	<b>6,000</b>	<b>91,750</b>	<b>0</b>	<b>91,750</b>	<b>(51,050)</b>	<b>40,700</b>
<b>Total, OMAO - PAC</b>	<b>6,000</b>	<b>91,750</b>	<b>0</b>	<b>91,750</b>	<b>(51,050)</b>	<b>40,700</b>
<b>GRAND TOTAL PAC</b>	<b>2,190,923</b>	<b>2,412,114</b>	<b>(38,939)</b>	<b>2,373,175</b>	<b>(91,354)</b>	<b>2,281,821</b>

## PAC ADJUSTMENTS All \$ in Thousands

FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
<b>SUBTOTAL DIRECT OBLIGATIONS</b>	<b>2,190,923</b>	<b>2,412,114</b>	<b>(38,939)</b>	<b>2,373,175</b>	<b>(91,354)</b>	<b>2,281,821</b>
<b>FINANCING</b>						
Deobligations	(13,000)	(13,000)	0	(13,000)	0	(13,000)
<b>Total PAC Financing</b>	<b>(13,000)</b>	<b>(13,000)</b>	<b>0</b>	<b>(13,000)</b>	<b>0</b>	<b>(13,000)</b>
<b>SUBTOTAL BUDGET AUTHORITY</b>	<b>2,177,923</b>	<b>2,399,114</b>	<b>(38,939)</b>	<b>2,360,175</b>	<b>(91,354)</b>	<b>2,268,821</b>
<b>TRANSFERS</b>						
Transfer to OIG	1,302	1,302	0	1,302	0	1,302
<b>Total PAC Transfers/Rescissions</b>	<b>1,302</b>	<b>1,302</b>	<b>0</b>	<b>1,302</b>	<b>0</b>	<b>1,302</b>
<b>SUBTOTAL APPROPRIATION</b>	<b>2,179,225</b>	<b>2,400,416</b>	<b>(38,939)</b>	<b>2,361,477</b>	<b>(91,354)</b>	<b>2,270,123</b>

## OTHER ACCOUNTS (DISCRETIONARY) All \$ in Thousands

FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
<b>NOS</b>						
National Oceans and Coastal Security Fund Obligations	0	0	0	0	10,000	10,000
National Oceans and Coastal Security Fund Budget Authority	0	0	0	0	10,000	10,000
National Oceans and Coastal Security Fund Appropriation	0	0	0	0	10,000	10,000
<b>Subtotal, NOS Other Discretionary Direct Obligation</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10,000</b>	<b>10,000</b>
<b>Subtotal, NOS Other Discretionary Budget Authority</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10,000</b>	<b>10,000</b>
<b>Subtotal, NOS Other Discretionary Appropriation</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10,000</b>	<b>10,000</b>
<b>NMFS</b>						
Fishermen's Contingency Fund Obligations	350	350	0	350	0	350
Fishermen's Contingency Fund Budget Authority	350	350	0	350	0	350
Fishermen's Contingency Fund Appropriations	350	350	0	350	0	350
Foreign Fishing Observer Fund Obligations	0	0	0	0	0	0
Foreign Fishing Observer Fund Budget Authority	0	0	0	0	0	0
Foreign Fishing Observer Fund Appropriation	0	0	0	0	0	0
Fisheries Finance Program Account Obligations	0	0	0	0	0	0
Fisheries Finance Program Account Budget Authority	0	0	0	0	0	0
Fisheries Finance Program Account Appropriation	0	0	0	0	0	0
Promote and Develop Fisheries Obligations	0	0	0	0	0	0
Promote and Develop Fisheries Budget Authority	(116,000)	(130,164)	0	(130,164)	0	(130,164)
Promote and Develop Fisheries Appropriation	0	0	0	0	0	0
Pacific Coastal Salmon Fund Obligations	65,000	65,000	0	65,000	0	65,000
Pacific Coastal Salmon Fund Budget Authority	65,000	65,000	0	65,000	0	65,000
Pacific Coastal Salmon Fund Appropriation	65,000	65,000	0	65,000	0	65,000
Marine Mammal Unusual Mortality Event Fund Obligations	0	50	0	50	0	50
Marine Mammal Unusual Mortality Event Fund Budget Authority	0	0	0	0	0	0
Marine Mammal Unusual Mortality Event Fund Appropriation	0	0	0	0	0	0
Fisheries Disaster Assistance Fund Obligations	0	0	0	0	9,000	9,000
Fisheries Disaster Assistance Fund Budget Authority	0	0	0	0	9,000	9,000
Fisheries Disaster Assistance Fund Appropriation	0	0	0	0	9,000	9,000

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FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
<b>Subtotal, NMFS Other Discretionary Direct Obligation</b>	<b>65,350</b>	<b>65,400</b>	<b>0</b>	<b>65,400</b>	<b>9,000</b>	<b>74,400</b>
<b>Subtotal, NMFS Other Discretionary Budget Authority</b>	<b>(50,650)</b>	<b>(64,814)</b>	<b>0</b>	<b>(64,814)</b>	<b>9,000</b>	<b>(55,814)</b>
<b>Subtotal, NMFS Other Discretionary Appropriation</b>	<b>65,350</b>	<b>65,350</b>	<b>0</b>	<b>65,350</b>	<b>9,000</b>	<b>74,350</b>
<b>OMAO</b>						
Medicare Eligible Retiree Healthcare Fund Acct Obligations	1,936	1,936	0	1,936	0	1,936
Medicare Eligible Retiree Healthcare Fund Acct Budget Authority	1,936	1,936	0	1,936	0	1,936
Medicare Eligible Retiree Healthcare Fund Acct Appropriations	1,936	1,936	0	1,936	0	1,936
<b>Subtotal, OMAO Other Discretionary Direct Obligations</b>	<b>1,936</b>	<b>1,936</b>	<b>0</b>	<b>1,936</b>	<b>0</b>	<b>1,936</b>
<b>Subtotal, OMAO Other Discretionary Budget Authority</b>	<b>1,936</b>	<b>1,936</b>	<b>0</b>	<b>1,936</b>	<b>0</b>	<b>1,936</b>
<b>Subtotal, OMAO Other Discretionary Appropriation</b>	<b>1,936</b>	<b>1,936</b>	<b>0</b>	<b>1,936</b>	<b>0</b>	<b>1,936</b>
<b>TOTAL, OTHER DISCRETIONARY DIRECT OBLIGATIONS</b>	<b>67,286</b>	<b>67,336</b>	<b>0</b>	<b>67,336</b>	<b>19,000</b>	<b>86,336</b>
<b>TOTAL, OTHER DISCRETIONARY BUDGET AUTHORITY</b>	<b>(48,714)</b>	<b>(62,878)</b>	<b>0</b>	<b>(62,878)</b>	<b>19,000</b>	<b>(43,878)</b>
<b>TOTAL, OTHER DISCRETIONARY APPROPRIATION</b>	<b>67,286</b>	<b>67,286</b>	<b>0</b>	<b>67,286</b>	<b>19,000</b>	<b>86,286</b>

## SUMMARY OF DISCRETIONARY RESOURCES All \$ in Thousands

FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
<b>Discretionary Direct Obligations</b>						
ORF Direct Obligations	3,333,398	3,453,477	113,585	3,567,062	74,782	3,641,844
PAC Direct Obligations	2,190,923	2,412,114	(38,939)	2,373,175	(91,354)	2,281,821
OTHER Direct Obligations	67,286	67,336	0	67,336	19,000	86,336
<b>TOTAL Discretionary Direct Obligations</b>	<b>5,591,607</b>	<b>5,932,927</b>	<b>74,646</b>	<b>6,007,573</b>	<b>2,428</b>	<b>6,010,001</b>
<b>Discretionary Budget Authority</b>						
ORF Budget Authority	3,318,398	3,435,977	113,585	3,549,562	74,782	3,624,344
PAC Budget Authority	2,177,923	2,399,114	(38,939)	2,360,175	(91,354)	2,268,821
OTHER Budget Authority	(48,714)	(62,878)	0	(62,878)	19,000	(43,878)
<b>TOTAL Discretionary Budget Authority</b>	<b>5,447,607</b>	<b>5,772,213</b>	<b>74,646</b>	<b>5,846,859</b>	<b>2,428</b>	<b>5,849,287</b>
<b>Discretionary Appropriations</b>						
ORF Appropriations	3,202,398	3,305,813	113,585	3,419,398	74,782	3,494,180
PAC Appropriations	2,179,225	2,400,416	(38,939)	2,361,477	(91,354)	2,270,123
OTHER Appropriations	67,286	67,286	0	67,286	19,000	86,286
<b>TOTAL Discretionary Appropriation</b>	<b>5,448,909</b>	<b>5,773,515</b>	<b>74,646</b>	<b>5,848,161</b>	<b>2,428</b>	<b>5,850,589</b>



## GRAND TOTAL SUMMARY DISCRETIONARY APPROPRIATIONS All \$ in Thousands

FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
Operations, Research and Facilities	3,202,398	3,305,813	113,585	3,419,398	74,782	3,494,180
Procurement, Acquisition and Construction	2,179,225	2,400,416	(38,939)	2,361,477	(91,354)	2,270,123
National Oceans and Coastal Security Fund	0	0	0	0	10,000	10,000
Fisherman's Contingency Fund	350	350	0	350	0	350
Foreign Fishing Observer Fund	0	0	0	0	0	0
Fisheries Financing Program Account	0	0	0	0	0	0
Pacific Coastal Salmon Fund	65,000	65,000	0	65,000	0	65,000
Fisheries Disaster Assistance Fund	0	0	0	0	9,000	9,000
Marine Mammal Unusual Mortality Event Fund	0	0	0	0	0	0
Medicare Eligible Retiree Health Care Fund	1,936	1,936	0	1,936	0	1,936
<b>GRAND TOTAL DISCRETIONARY APPROPRIATION</b>	<b>5,448,909</b>	<b>5,773,515</b>	<b>74,646</b>	<b>5,848,161</b>	<b>2,428</b>	<b>5,850,589</b>

## OTHER ACCOUNTS (MANDATORY) All \$ in Thousands

FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
<b>NOS</b>						
Damage Assessment & Restoration Revolving Fund Obligations	48,611	97,568	(75,600)	21,968	0	21,968
Damage Assessment & Restoration Revolving Fund Budget Authority	6,170	5,968	0	5,968	0	5,968
Damage Assessment & Restoration Revolving Fund Appropriation	0	0	0	0	0	0
Sanctuaries Enforcement Asset Forfeiture Fund Obligations	242	125	(5)	120	0	120
Sanctuaries Enforcement Asset Forfeiture Fund Budget Authority	242	125	(5)	120	0	120
Sanctuaries Enforcement Asset Forfeiture Fund Appropriation	183	120	0	120	0	120
Gulf Coast Ecosystem Restoration Fund Obligations	2,078	354	5,362	5,716	0	5,716
Gulf Coast Ecosystem Restoration Fund Budget Authority	2,078	0	0	0	0	0
Gulf Coast Ecosystem Restoration Fund Appropriation	2,078	0	0	0	0	0
<b>Subtotal, NOS Other Mandatory Direct Obligations</b>	<b>50,931</b>	<b>98,047</b>	<b>(70,243)</b>	<b>27,804</b>	<b>0</b>	<b>27,804</b>
<b>Subtotal, NOS Other Mandatory Budget Authority</b>	<b>8,490</b>	<b>6,093</b>	<b>(5)</b>	<b>6,088</b>	<b>0</b>	<b>6,088</b>
<b>Subtotal, NOS Other Mandatory Appropriation</b>	<b>2,261</b>	<b>120</b>	<b>0</b>	<b>120</b>	<b>0</b>	<b>120</b>
<b>NMFS</b>						
Promote and Develop Fisheries Obligations	26,615	16,225	(578)	15,647	0	15,647
Promote and Develop Fisheries Budget Authority	142,615	146,389	(578)	145,811	0	145,811
Promote and Develop Fisheries Appropriation	0	0	0	0	0	0
Fisheries Finance Program Account Obligations	22,757	11,819	(11,819)	0	0	0
Fisheries Finance Program Account Budget Authority	22,757	11,819	(11,819)	0	0	0
Fisheries Finance Program Account Appropriation	22,757	11,819	(11,819)	0	0	0
Federal Ship Financing Obligations	0	0	0	0	0	0
Federal Ship Financing Budget Authority	0	0	0	0	0	0
Federal Ship Financing Appropriation	0	0	0	0	0	0
Environmental Improve & Restoration Fund Obligations	1,311	8,815	(7,671)	1,144	0	1,144
Environmental Improve & Restoration Fund Budget Authority	1,311	9,359	(5,187)	4,172	0	4,172
Environmental Improve & Restoration Fund Appropriation	1,414	10,042	(5,566)	4,476	0	4,476
Limited Access System Administration Fund Obligations	10,893	12,636	106	12,742	0	12,742
Limited Access System Administration Fund Budget Authority	11,710	12,507	72	12,579	0	12,579
Limited Access System Administration Fund Appropriation	11,855	12,492	92	12,584	0	12,584

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FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
Western Pacific Sustainable Fisheries Fund Obligations	322	391	9	400	0	400
Western Pacific Sustainable Fisheries Fund Budget Authority	322	391	9	400	0	400
Western Pacific Sustainable Fisheries Fund Appropriation	250	400	0	400	0	400
Fisheries Enforcement Asset Forfeiture Fund Obligations	4,052	2,870	23	2,893	0	2,893
Fisheries Enforcement Asset Forfeiture Fund Budget Authority	4,068	4,020	(20)	4,000	0	4,000
Fisheries Enforcement Asset Forfeiture Fund Appropriation	4,000	4,000	0	4,000	0	4,000
North Pacific Observer Fund Obligations	4,756	4,050	(80)	3,970	0	3,970
North Pacific Observer Fund Budget Authority	4,756	4,050	(80)	3,970	0	3,970
North Pacific Observer Fund Appropriation	4,800	3,970	0	3,970	0	3,970
<b>Subtotal, NMFS Other Mandatory Direct Obligations</b>	<b>70,706</b>	<b>56,806</b>	<b>(20,010)</b>	<b>36,796</b>	<b>0</b>	<b>36,796</b>
<b>Subtotal, NMFS Other Mandatory Budget Authority</b>	<b>187,539</b>	<b>188,535</b>	<b>(17,603)</b>	<b>170,932</b>	<b>0</b>	<b>170,932</b>
<b>Subtotal, NMFS Other Mandatory Appropriation</b>	<b>45,076</b>	<b>42,723</b>	<b>(17,293)</b>	<b>25,430</b>	<b>0</b>	<b>25,430</b>
<b>OMAO</b>						
NOAA Corp Commissioned Officers Retirement Obligations	28,269	29,375	0	29,375	0	29,375
NOAA Corp Commissioned Officers Retirement Budget Authority	28,269	29,375	0	29,375	0	29,375
NOAA Corp Commissioned Officers Retirement Budget Appropriation	28,269	29,375	0	29,375	0	29,375
Recapitalized Research Fleet Obligations	0	0	0	0	[100,000]	[100,000]
Recapitalized Research Fleet Budget Authority	0	0	0	0	[100,000]	[100,000]
Recapitalized Research Fleet Appropriation	0	0	0	0	[100,000]	[100,000]
<b>Subtotal, OMAO Other Mandatory Direct Obligations</b>	<b>28,269</b>	<b>29,375</b>	<b>0</b>	<b>29,375</b>	<b>0</b>	<b>29,375</b>
<b>Subtotal, OMAO Other Mandatory Budget Authority</b>	<b>28,269</b>	<b>29,375</b>	<b>0</b>	<b>29,375</b>	<b>0</b>	<b>29,375</b>
<b>Subtotal, OMAO Other Mandatory Appropriation</b>	<b>28,269</b>	<b>29,375</b>	<b>0</b>	<b>29,375</b>	<b>0</b>	<b>29,375</b>
<b>TOTAL, OTHER MANDATORY DIRECT OBLIGATIONS</b>	<b>149,906</b>	<b>184,228</b>	<b>(90,253)</b>	<b>93,975</b>	<b>0</b>	<b>93,975</b>
<b>TOTAL, OTHER MANDATORY BUDGET AUTHORITY</b>	<b>224,298</b>	<b>224,003</b>	<b>(17,608)</b>	<b>206,395</b>	<b>0</b>	<b>206,395</b>
<b>TOTAL, OTHER MANDATORY APPROPRIATION</b>	<b>75,606</b>	<b>72,218</b>	<b>(17,293)</b>	<b>54,925</b>	<b>0</b>	<b>54,925</b>

## NOAA SUMMARY All \$ in Thousands

FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
<b>TOTAL Direct Obligations (Discretionary &amp; Mandatory)</b>	<b>5,741,513</b>	<b>6,117,155</b>	<b>(15,607)</b>	<b>6,101,548</b>	<b>2,428</b>	<b>6,103,976</b>
<b>TOTAL Budget Authority (Discretionary &amp; Mandatory)</b>	<b>5,671,905</b>	<b>5,996,216</b>	<b>57,038</b>	<b>6,053,254</b>	<b>2,428</b>	<b>6,055,682</b>
<b>TOTAL Appropriation (Discretionary &amp; Mandatory)</b>	<b>5,524,515</b>	<b>5,845,733</b>	<b>57,353</b>	<b>5,903,086</b>	<b>2,428</b>	<b>5,905,514</b>
Reimbursable Financing	406,969	393,089	(151,089)	242,000	0	242,000
<b>TOTAL OBLIGATIONS (Direct &amp; Reimbursable)</b>	<b>6,148,482</b>	<b>6,510,244</b>	<b>(166,696)</b>	<b>6,343,548</b>	<b>2,428</b>	<b>6,345,976</b>
Offsetting Receipts	(5,439)	(3,835)	3,425	(410)	0	(410)
<b>TOTAL OBLIGATIONS (Direct, Reimbursable &amp; Offsetting Receipts)</b>	<b>6,143,043</b>	<b>6,506,409</b>	<b>(163,271)</b>	<b>6,343,138</b>	<b>2,428</b>	<b>6,345,566</b>



## LINE OFFICE SUMMARY All \$ in Thousands

FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
<b>National Ocean Service</b>						
ORF	481,107	500,100	5,159	505,259	23,152	528,411
PAC	3,700	3,700	0	3,700	0	3,700
OTHER	50,931	98,047	(70,243)	27,804	10,000	37,804
<b>TOTAL, NOS</b>	<b>535,738</b>	<b>601,847</b>	<b>(65,084)</b>	<b>536,763</b>	<b>33,152</b>	<b>569,915</b>
<b>National Marine Fisheries Service</b>						
ORF	822,138	849,497	12,451	861,948	42,786	904,734
PAC	0	0	0	0	0	0
OTHER	136,056	122,206	(20,010)	102,196	9,000	111,196
<b>TOTAL, NMFS</b>	<b>958,194</b>	<b>971,703</b>	<b>(7,559)</b>	<b>964,144</b>	<b>51,786</b>	<b>1,015,930</b>
<b>Oceanic and Atmospheric Research</b>						
ORF	432,900	461,898	7,054	468,952	24,458	493,410
PAC	13,379	20,079	0	20,079	6,300	26,379
OTHER	0	0	0	0	0	0
<b>TOTAL, OAR</b>	<b>446,279</b>	<b>481,977</b>	<b>7,054</b>	<b>489,031</b>	<b>30,758</b>	<b>519,789</b>
<b>National Weather Service</b>						
ORF	954,153	988,834	13,694	1,002,528	(26,021)	976,507
PAC	133,300	135,315	0	135,315	7,470	142,785
OTHER	0	0	0	0	0	0
<b>TOTAL, NWS</b>	<b>1,087,453</b>	<b>1,124,149</b>	<b>13,694</b>	<b>1,137,843</b>	<b>(18,551)</b>	<b>1,119,292</b>
<b>National Environmental Satellite, Data and Information Service</b>						
ORF	188,600	189,086	42,431	231,517	8,470	239,987
PAC	2,034,544	2,160,270	(38,939)	2,121,331	(57,631)	2,063,700
OTHER	0	0	0	0	0	0
<b>TOTAL, NESDIS</b>	<b>2,223,144</b>	<b>2,349,356</b>	<b>3,492</b>	<b>2,352,848</b>	<b>(49,161)</b>	<b>2,303,687</b>
<b>Mission Support</b>						
ORF	247,900	252,931	28,640	281,571	(63)	281,508
PAC	0	1,000	0	1,000	3,557	4,557
OTHER	0	0	0	0	0	0
<b>SUBTOTAL, Mission Support</b>	<b>247,900</b>	<b>253,931</b>	<b>28,640</b>	<b>282,571</b>	<b>3,494</b>	<b>286,065</b>

FY 2017 PROPOSED OPERATING PLAN	FY 2015 Spend Plan	FY 2016 Enacted	FY 2017 Total ATBs	FY 2017 Base	FY 2017 Program Changes	FY 2017 President's Budget
<b>Office of Marine and Aviation Operations</b>						
ORF	206,600	211,131	4,156	215,287	2,000	217,287
PAC	6,000	91,750	0	91,750	(51,050)	40,700
OTHER	30,205	31,311	0	31,311	0	31,311
<b>TOTAL, OMAO</b>	<b>242,805</b>	<b>334,192</b>	<b>4,156</b>	<b>338,348</b>	<b>(49,050)</b>	<b>289,298</b>
<b>DIRECT OBLIGATIONS</b>						
ORF	3,333,398	3,453,477	113,585	3,567,062	74,782	3,641,844
PAC	2,190,923	2,412,114	(38,939)	2,373,175	(91,354)	2,281,821
OTHER	217,192	251,564	(90,253)	161,311	19,000	180,311
<b>TOTAL, DIRECT OBLIGATIONS</b>	<b>5,741,513</b>	<b>6,117,155</b>	<b>(15,607)</b>	<b>6,101,548</b>	<b>2,428</b>	<b>6,103,976</b>
<b>ORF Adjustments (Deobligations/Rescissions)</b>	(15,000)	(17,500)	0	(17,500)	0	(17,500)
<b>ORF Transfers</b>	(116,000)	(130,164)	0	(130,164)	0	(130,164)
<b>PAC Adjustments (Deobligations/Rescissions)</b>	(13,000)	(13,000)	0	(13,000)	0	(13,000)
<b>PAC Transfers</b>	1,302	1,302	0	1,302	0	1,302
<b>OTHER Discretionary Adjustments</b>	0	(50)	0	(50)	0	(50)
<b>Mandatory Accounts Excluded</b>	(149,906)	(184,228)	90,253	(93,975)	0	(93,975)
<b>TOTAL, DISCRETIONARY APPROPRIATIONS</b>	<b>5,448,909</b>	<b>5,773,515</b>	<b>74,646</b>	<b>5,848,161</b>	<b>2,428</b>	<b>5,850,589</b>





United States Department of Commerce  
National Oceanic and Atmospheric Administration  
[www.noaa.gov](http://www.noaa.gov)

14th and Constitution Avenue, NW  
Washington, DC 20230

National Ocean Service  
[www.nos.noaa.gov](http://www.nos.noaa.gov)

National Marine Fisheries Service  
[www.nmfs.noaa.gov](http://www.nmfs.noaa.gov)

Office of Oceanic and Atmospheric Research  
[www.oar.noaa.gov](http://www.oar.noaa.gov)

National Weather Service  
[www.nws.noaa.gov](http://www.nws.noaa.gov)

National Satellite and Information Service  
[www.nesdis.noaa.gov](http://www.nesdis.noaa.gov)

Office of Marine and Aviation Operations  
[www.oma.noaa.gov](http://www.oma.noaa.gov)