

**NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION**



**BUDGET  
ESTIMATES  
FISCAL YEAR 2017**

**CONGRESSIONAL SUBMISSION**

**PRIVILEGED**

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the Congress.**



**Budget Estimates, Fiscal Year 2017  
Congressional Submission**

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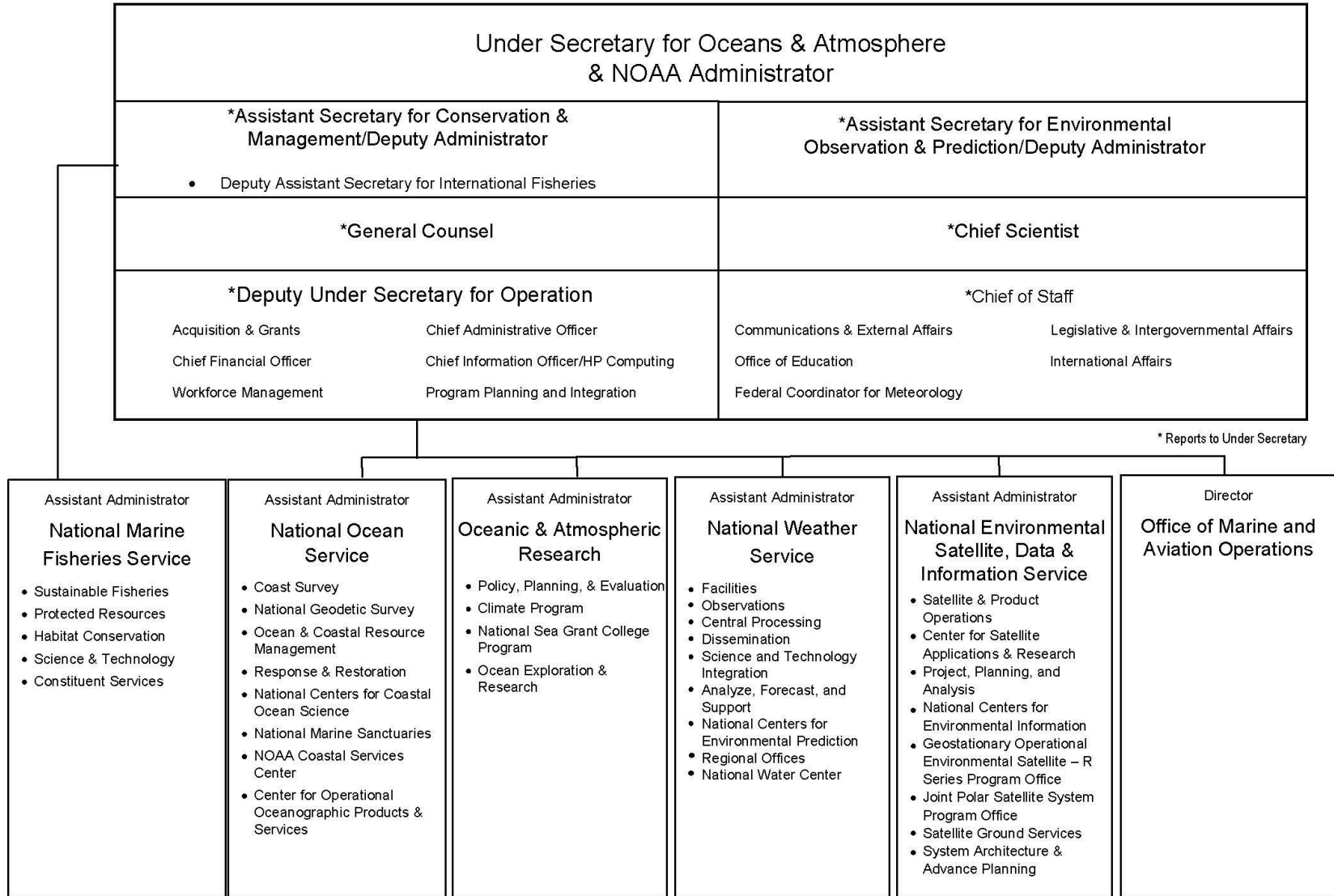
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U.S. DEPARTMENT OF COMMERCE  
**NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION**



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## EXECUTIVE SUMMARY

### Introduction

For Fiscal Year (FY) 2017, the National Oceanic and Atmospheric Administration (NOAA) proposes a budget of \$5,850,589,000 in discretionary appropriations, an increase of \$77,074,000 or 1.3 percent, above the FY 2016 enacted appropriations level. The FY 2017 budget submission positions NOAA as a leader in providing critical environmental intelligence to maximize public safety and economic opportunity across the Nation and internationally. This budget advances NOAA priorities to: 1) provide information and services to make communities more resilient; 2) continue to evolve the National Weather Service (NWS); 3) invest in the next generation of observational infrastructure; and 4) achieve organizational excellence.

Below are highlights of the FY 2017 investments in each of the priority areas:

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

Communities across the country continue to struggle with the effects of extreme environmental events, such as hurricanes, drought, and fisheries collapse. The ongoing California drought is a paramount example of the environmental and socioeconomic devastation that environmental events can wreak on natural systems and human communities. The FY 2017 budget 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 our Nation. Through a \$12,250,000 investment in Integrated Water Prediction, NOAA will leverage the National Water Center in Tuscaloosa, Alabama and link current expertise around the country to promote innovation in water prediction capability and service delivery. Through the Integrated Water Prediction initiative, NOAA will develop and deliver new and improved products that put critical water forecast information into the hands of local decision makers and members of the public. This will include street-level water information for every stream reach in the United States, at 2,700,000 locations, up from 4,000 locations provided today. This forecasting framework will be over 700 times more spatially dense and 20 times more frequent than the current NWS hydrologic forecast system and will result in an integrated river and stream forecast for over 100 million Americans who do not currently receive one today (including populations in major metropolitan centers of Boston, New York City, Baltimore, Washington, D.C., Charleston, Savannah, Jacksonville, New Orleans, Houston, Los Angeles, San Francisco, and Seattle).

In FY 2017, NOAA requests an increase of \$19,929,000 to strengthen consultation and permitting capacity required to ensure timely review of development projects while meeting species and habitat protection mandates under the Endangered Species Act, Marine Mammal Protection Act, and Magnuson-Stevens Act. Increased project requests, including those promoting the ecologic and economic recovery of the Gulf coast in the aftermath the Deepwater Horizon oil spill, necessitate increased capacity to ensure that permits and consultations are completed in a manner that is timely and that enables the Nation's economic engine to move forward without unnecessary delays.

Through a \$10,000,000 request in this budget, NOAA seeks to fund the National Oceans and Coastal Security Fund established by Title IX of the Consolidated Appropriations Act, 2016. Through this Fund, NOAA, in partnership with the National Fish and Wildlife Foundation, will initiate a grant program to improve understanding and use of ocean and coastal resources and

coastal infrastructure through baseline scientific research, ocean observing, and other programs in coordination with Federal, tribal, and state partners.

### **Continue to Evolve the National Weather Service**

NOAA has made considerable progress in evolving the NWS over the past few years. For example, NOAA has significantly upgraded its supercomputing capacity, implemented a new and more efficient budget structure and reorganization, and begun an assessment of our workforce to improve how we deliver forecast and extreme weather incident support into the future. In FY 2017, while we continue to develop a path forward for our workforce, we will focus requested funding on extending the lifetime of essential infrastructure that is the backbone of our forecast capability.

The FY 2017 budget requests \$8,535,000 to continue the Service Life Extension Program (SLEP) to maintain Next Generation Weather Radar (NEXRAD) infrastructure, which underpins severe weather forecast and warning services for high-impact events, such as tornadoes. The SLEP will extend the useful life of the NEXRAD array by approximately 15 years. Without this investment, NEXRAD availability will continue to degrade, resulting in long-duration radar outages and regional gaps in service.

In addition, NOAA requests \$7,500,000 to begin a service life extension for its Automated Service Observation System (ASOS), the Nation's primary surface weather observing system. ASOS information helps the NWS increase the accuracy and timeliness of its forecasts and warnings, particularly near airports, to increase aviation safety and efficiency. Beginning this effort now will synchronize 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.

With NEXRAD and ASOS upgrades, continuation of efforts to integrate dissemination systems, and continued progress on the workforce analysis, NOAA continues to meet its major milestones toward building an innovative NWS and a Weather-Ready Nation.

### **Invest in Observational Infrastructure**

The Consolidated Appropriations Act, 2016 funded NOAA's FY 2016 request for the Polar Follow On (PFO), a significant investment to ensure the continuity of polar satellite observing systems, which provide the primary data inputs for NOAA's numerical weather prediction models. The FY 2017 budget continues the investment in this critical program. More specifically, the FY 2017 request includes an additional \$23,000,000 to continue development activities in support of the PFO/JPSS-3 and PFO/JPSS-4 missions and an advanced technology Earth Observing Nanosatellite-Microwave (EON-MW) to ensure system robustness and continuity of polar observations through FY 2038.

To enable regular upgrades of its supercomputing capacity, the backbone of NOAA's weather, climate, and broader environmental modeling efforts, NOAA seeks \$6,300,000 to establish a new funding model to provide stable and up-to-date computing capacity. The funding will allow regular refresh and recapitalization of NOAA's R&D high performance computers via a leasing mechanism, which shifts the burden of future equipment obsolescence to the service provider. In FY 2017, NOAA requests an additional \$2,000,000 to build on funds provided by Congress in FY 2016 to continue to seek opportunities to test and validate data from commercial satellite systems and, if testing is successful, support pilot commercial data buys for operational use. This request is consistent with the *NOAA Commercial Space Policy*, released January 8, 2016.

NOAA's fleet of ships is aging, with half 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 RSV 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 a lower acquisition and operations and maintenance costs than the OSV. Investment in an OSV has been shifted to a later date. Therefore, the \$80,050,000 million provided in 2016 along with the \$24,000,000 in 2017 will allow NOAA to complete design, acquisition and construction of a Regional Survey Vessel (RSV).

Broadly, the RSV will support fishery surveys critical to species management, habitat and hydrographic surveys, and disaster response. Specific RSV design and capabilities will be based on NOAA prioritized at-sea data collection requirements and regionally-driven specifications. Without initiation of replacement vessels for several RSVs in the short term, NOAA's ability to conduct stock assessments in certain regions will be drastically decreased, resulting in fishery management decisions based on less complete data and lost fishing opportunity and associated economic opportunities in coastal communities. The RSV will have the capabilities to fulfill the mission requirements of the ships scheduled first for retirement, NOAA ships *Oregon II* and *Oscar Elton Sette*. The exact succession of ship replacements will be determined based on a number of factors including ship material condition, prioritized requirements, and fleet recapitalization timelines.

### **Achieve Organizational Excellence**

Revamping aging facilities – which house our most critical asset, our workforce – is critical to achieving organizational excellence. In FY 2017, NOAA requests \$4,557, 000 to initiate rebuilding 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. The results of this research are used in fisheries harvest and socioeconomic models that contribute to fisheries management decisions. The structural condition of the facility, which was built in the 1940s and formerly owned by the Department of Defense, has deteriorated to the point that it poses a 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 also proposes \$6,242,000 to aggressively address information technology security issues throughout the organization. This modest investment will help NOAA modernize and streamline its IT systems, reducing the susceptibility of our world class environmental data to the threat of cyber-attack.

And finally, a primary internal goal of NOAA leadership has been to reshape NOAA into a "service agency" based on cutting-edge science. A key component of this is to ensure that we are able to speed the use of science for decisions by accelerating the research-to-operations pipeline and investing in further support of the Lab-to-Market Cross-Agency Priority Goal. To this end, NOAA requests an increase of \$10,000,000 for a Research Transition Acceleration Program to create a new path 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. This initiative will ensure that 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 detailed plans for reliable delivery of products and services.

### **Conclusion**

In closing, NOAA's FY 2017 budget submission supports our role as the Nation's foremost environmental intelligence agency – providing weather, water, fisheries, hydrographic, and other essential information to the public. This submission, detailed further in the chapters and exhibits that follow, is critical for FY 2017 as we position ourselves to overcome the challenges of the future. This budget will help the Department and the Administration execute its overarching priorities and help communities across the United States better prepare for and respond to the growing environmental challenges we all face.

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
**PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS**  
 (Dollar Amounts in Thousands)

Comparison by program/sub-program		FY 2015		FY 2016		FY 2017		FY 2017		Increase/ (Decrease)	
		Actuals		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
<b>NATIONAL OCEAN SERVICE (NOS)</b>											
Navigation, Observations and Positioning	Pos/BA	532	191,404	581	205,500	581	207,906	581	197,906	0	(10,000)
	FTE/OBL	531	188,867	552	212,674	552	207,906	552	197,906	0	(10,000)
Coastal Science and Assessment	Pos/BA	261	79,561	313	81,600	313	83,112	313	87,112	0	4,000
	FTE/OBL	260	80,169	297	82,743	297	83,112	297	87,112	0	4,000
Ocean and Coastal Management and Services	Pos/BA	334	207,499	363	213,000	363	214,241	365	243,393	2	29,152
	FTE/OBL	333	204,679	346	220,521	346	214,241	348	243,393	2	29,152
<b>TOTAL NOS - ORF</b>	Pos/BA	<b>1,127</b>	<b>478,464</b>	<b>1,257</b>	<b>500,100</b>	<b>1,257</b>	<b>505,259</b>	<b>1,259</b>	<b>528,411</b>	<b>2</b>	<b>23,152</b>
	FTE/OBL	<b>1,124</b>	<b>473,715</b>	<b>1,195</b>	<b>515,938</b>	<b>1,195</b>	<b>505,259</b>	<b>1,197</b>	<b>528,411</b>	<b>2</b>	<b>23,152</b>
<b>TOTAL NOS - PAC</b>	Pos/BA	<b>2</b>	<b>3,674</b>	<b>5</b>	<b>3,700</b>	<b>5</b>	<b>3,700</b>	<b>5</b>	<b>3,700</b>	<b>0</b>	<b>0</b>
	FTE/OBL	<b>2</b>	<b>4,446</b>	<b>5</b>	<b>4,919</b>	<b>5</b>	<b>3,700</b>	<b>5</b>	<b>3,700</b>	<b>0</b>	<b>0</b>
National Oceans and Coastal Security Fund	Pos/BA	0	0	0	0	0	0	1	10,000	1	10,000
	FTE/OBL	0	0	0	0	0	0	1	10,000	1	10,000
Damage Assessment and Restoration Revolving Fund	Pos/BA	48	3,536	16	5,968	16	5,968	16	5,968	0	0
	FTE/OBL	48	139,439	16	152,819	16	21,968	16	21,968	0	0
Sanctuaries Asset Forfeiture Fund	Pos/BA	0	(4)	0	125	0	120	0	120	0	0
	FTE/OBL	0	86	0	392	0	120	0	120	0	0
Gulf Coast Ecosystem Restoration Fund	Pos/BA	0	0	1	0	1	0	1	0	0	0
	FTE/OBL	0	2,976	1	354	1	5,716	1	5,716	0	0
<b>TOTAL NOS</b>	Pos/BA	<b>1,177</b>	<b>485,670</b>	<b>1,279</b>	<b>509,893</b>	<b>1,279</b>	<b>515,047</b>	<b>1,282</b>	<b>548,199</b>	<b>3</b>	<b>33,152</b>
	FTE/OBL	<b>1,174</b>	<b>620,662</b>	<b>1,217</b>	<b>674,422</b>	<b>1,217</b>	<b>536,763</b>	<b>1,220</b>	<b>569,915</b>	<b>3</b>	<b>33,152</b>

**Department of Commerce**  
**National Oceanic and Atmospheric Administration**  
**PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS**  
(Dollar Amounts in Thousands)

Comparison by program/sub-program		FY 2015		FY 2016		FY 2017		FY 2017		Increase/ (Decrease)	
		Actuals		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
<b>NATIONAL MARINE FISHERIES SERVICES (NMFS)</b>											
Protected Species Research and Management	Pos/BA	750	177,718	0	0	0	0	0	0	0	0
	FTE/OBL	749	178,865	0	0	0	0	0	0	0	0
Fisheries Research and Management	Pos/BA	1,312	425,988	0	0	0	0	0	0	0	0
	FTE/OBL	1,310	427,889	0	0	0	0	0	0	0	0
Enforcement and Observers/Training	Pos/BA	337	107,407	0	0	0	0	0	0	0	0
	FTE/OBL	336	108,750	0	0	0	0	0	0	0	0
Habitat Conservation & Restoration	Pos/BA	121	46,742	0	0	0	0	0	0	0	0
	FTE/OBL	121	41,914	0	0	0	0	0	0	0	0
Other Activities Supporting Fisheries	Pos/BA	186	59,882	0	0	0	0	0	0	0	0
	FTE/OBL	186	60,439	0	0	0	0	0	0	0	0
Protected Resources Science and Management	Pos/BA	0	0	853	182,409	853	184,969	888	216,771	35	31,802
	FTE/OBL	0	0	811	186,065	811	184,969	837	216,771	26	31,802
Fisheries Science and Management	Pos/BA	0	0	1,792	536,680	1,792	545,226	1,792	558,715	0	13,489
	FTE/OBL	0	0	1,706	549,880	1,706	545,226	1,706	558,715	0	13,489
Enforcement	Pos/BA	0	0	248	69,000	248	69,840	248	70,858	0	1,018
	FTE/OBL	0	0	232	73,253	237	69,840	237	70,858	0	1,018
Habitat Conservation & Restoration	Pos/BA	0	0	160	61,408	160	61,913	176	58,390	16	(3,523)
	FTE/OBL	0	0	154	67,241	154	61,913	166	58,390	12	(3,523)
<b>TOTAL NMFS - ORF</b>	<b>Pos/BA</b>	<b>2,706</b>	<b>817,737</b>	<b>3,053</b>	<b>849,497</b>	<b>3,053</b>	<b>861,948</b>	<b>3,104</b>	<b>904,734</b>	<b>51</b>	<b>42,786</b>
	<b>FTE/OBL</b>	<b>2,702</b>	<b>817,857</b>	<b>2,903</b>	<b>876,439</b>	<b>2,908</b>	<b>861,948</b>	<b>2,946</b>	<b>904,734</b>	<b>38</b>	<b>42,786</b>

\*NMFS FY 2016 ORF Obligation amounts are estimates only under the new PPA structure. They reflect carryover from prior years which will be obligated in the PPA in which it was originally appropriated.



**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
**PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS**  
 (Dollar Amounts in Thousands)

Comparison by program/sub-program		FY 2015		FY 2016		FY 2017		FY 2017		Increase/ (Decrease)	
		Actuals		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
<b>TOTAL NMFS - PAC</b>	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	67	0	1,888	0	0	0	0	0	0
Pacific Coastal Salmon Recovery Fund	Pos/BA	2	64,935	2	65,000	2	65,000	2	65,000	0	0
	FTE/OBL	2	64,936	2	65,001	2	65,000	2	65,000	0	0
Fishermen's Contingency Fund	Pos/BA	0	350	0	350	0	350	0	350	0	0
	FTE/OBL	0	72	0	350	0	350	0	350	0	0
Foreign Fishing Observer Fund	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
Fisheries Finance Program Account	Pos/BA	0	22,757	0	11,819	0	0	0	0	0	0
	FTE/OBL	0	22,757	0	11,819	0	0	0	0	0	0
Federal Ship Financing	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	29	0	0	0	0	0	0	0	0
Promote and Develop Fisheries Products	Pos/BA	3	26,616	0	16,225	0	15,647	0	15,647	0	0
	FTE/OBL	3	32,351	0	17,308	0	15,647	0	15,647	0	0
Environmental Improvement and Restoration Fund	Pos/BA	0	705	0	9,359	0	4,172	0	4,172	0	0
	FTE/OBL	0	8,988	0	8,815	0	1,144	0	1,144	0	0
Limited Access System Administration Fund	Pos/BA	39	10,211	38	12,507	38	12,579	38	12,579	0	0
	FTE/OBL	39	11,222	38	12,636	38	12,742	38	12,742	0	0
Marine Mammal Unusual Mortality Event Fund	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	50	0	50	0	50	0	0
Western Pacific Sustainable Fisheries Fund	Pos/BA	0	247	0	391	0	400	0	400	0	0
	FTE/OBL	0	157	0	481	0	400	0	400	0	0

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Comparison by program/sub-program		FY 2015		FY 2016		FY 2017		FY 2017		Increase/ (Decrease)	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
<b>Fisheries Enforcement Asset</b>	<b>Pos/BA</b>	<b>0</b>	<b>4,220</b>	<b>0</b>	<b>4,020</b>	<b>0</b>	<b>4,000</b>	<b>0</b>	<b>4,000</b>	<b>0</b>	<b>0</b>
<b>Forfeiture Fund</b>	<b>FTE/OBL</b>	<b>0</b>	<b>949</b>	<b>0</b>	<b>2,870</b>	<b>0</b>	<b>2,893</b>	<b>0</b>	<b>2,893</b>	<b>0</b>	<b>0</b>
<b>North Pacific Observer Fund</b>	<b>Pos/BA</b>	<b>0</b>	<b>3,412</b>	<b>0</b>	<b>4,050</b>	<b>0</b>	<b>3,970</b>	<b>0</b>	<b>3,970</b>	<b>0</b>	<b>0</b>
	<b>FTE/OBL</b>	<b>0</b>	<b>3,058</b>	<b>0</b>	<b>5,305</b>	<b>0</b>	<b>3,970</b>	<b>0</b>	<b>3,970</b>	<b>0</b>	<b>0</b>
<b>Fisheries Disaster Assistance Fund</b>	<b>Pos/BA</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9,000</b>	<b>0</b>	<b>9,000</b>
	<b>FTE/OBL</b>	<b>0</b>	<b>44,830</b>	<b>0</b>	<b>4,358</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9,000</b>	<b>0</b>	<b>9,000</b>
<b>TOTAL NMFS</b>	<b>Pos/BA</b>	<b>2,750</b>	<b>951,190</b>	<b>3,093</b>	<b>973,218</b>	<b>3,093</b>	<b>968,066</b>	<b>3,144</b>	<b>1,019,852</b>	<b>51</b>	<b>51,786</b>
	<b>FTE/OBL</b>	<b>2,746</b>	<b>1,007,273</b>	<b>2,943</b>	<b>1,007,320</b>	<b>2,948</b>	<b>964,144</b>	<b>2,986</b>	<b>1,015,930</b>	<b>38</b>	<b>51,786</b>
<b>OFFICE OCEANIC AND ATMOSPHERIC RESEARCH (OAR)</b>											
Climate Research											
Laboratories & Cooperative Institutes	Pos/BA	166	59,670	202	60,000	202	60,420	204	70,913	2	10,493
	FTE/OBL	166	60,057	190	61,340	190	60,420	192	70,913	2	10,493
Regional Climate Data & Information	Pos/BA	17	37,791	21	38,000	21	38,266	25	52,703	4	14,437
	FTE/OBL	17	38,006	19	39,684	19	38,266	22	52,703	3	14,437
Climate Competitive Research	Pos/BA	36	59,670	66	60,000	66	60,420	67	66,250	1	5,830
	FTE/OBL	36	59,427	63	60,879	63	60,420	64	66,250	1	5,830
Total: Climate Research	Pos/BA	219	157,131	289	158,000	289	159,106	296	189,866	7	30,760
	FTE/OBL	219	157,490	272	161,903	272	159,106	278	189,866	6	30,760
Weather & Air Chemistry Research											
Laboratories & Cooperative Institutes	Pos/BA	183	69,615	228	76,000	228	80,549	228	72,653	0	(7,896)
	FTE/OBL	182	70,984	218	76,554	218	80,549	218	72,653	0	(7,896)
Weather & Air Chemistry Research Programs	Pos/BA	4	20,686	5	27,158	5	27,214	6	29,292	1	2,078
	FTE/OBL	4	20,617	5	27,601	5	27,214	6	29,292	1	2,078

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		Actuals		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Total: Weather & Air Chemistry Research	Pos/BA	187	90,301	233	103,158	233	107,763	234	101,945	1	(5,818)
	FTE/OBL	186	91,601	223	104,155	223	107,763	224	101,945	1	(5,818)
Ocean, Coastal, and Great Lakes Research											
Laboratories & Cooperative Institutes	Pos/BA	95	26,852	138	32,000	138	32,374	138	27,389	0	(4,985)
	FTE/OBL	95	27,844	132	33,966	132	32,374	132	27,389	0	(4,985)
National Sea Grant College Program	Pos/BA	8	66,930	15	73,000	15	73,448	15	68,900	0	(4,548)
	FTE/OBL	8	67,287	14	74,825	14	73,448	14	68,900	0	(4,548)
Ocean Exploration and Research	Pos/BA	18	27,846	20	32,000	20	32,224	20	19,568	0	(12,656)
	FTE/OBL	18	28,092	19	32,737	19	32,224	19	19,568	0	(12,656)
										0	
Other Ecosystem Programs	Pos/BA	12	8,454	20	10,000	20	10,070	20	21,775	0	11,705
	FTE/OBL	12	8,496	16	10,062	18	10,070	18	21,775	0	11,705
Sustained Observations and Monitoring	Pos/BA	32	41,073	49	41,596	49	41,823	49	41,823	0	0
	FTE/OBL	32	40,369	47	42,293	47	41,823	47	41,823	0	0
Total: Ocean, Coastal, and Great Lakes Research	Pos/BA	165	171,155	242	188,596	242	189,939	242	179,455	0	(10,484)
	FTE/OBL	165	172,088	228	193,883	230	189,939	230	179,455	0	(10,484)
	Pos/BA	10	11,934	11	12,144	11	12,144	13	22,144	2	10,000
Innovative Research & Technology	FTE/OBL	10	12,150	10	12,769	10	12,144	12	22,144	2	10,000
<b>TOTAL OAR - ORF</b>	<b>Pos/BA</b>	<b>581</b>	<b>430,521</b>	<b>775</b>	<b>461,898</b>	<b>775</b>	<b>468,952</b>	<b>785</b>	<b>493,410</b>	<b>10</b>	<b>24,458</b>
	<b>FTE/OBL</b>	<b>580</b>	<b>433,329</b>	<b>733</b>	<b>472,710</b>	<b>735</b>	<b>468,952</b>	<b>744</b>	<b>493,410</b>	<b>9</b>	<b>24,458</b>
<b>TOTAL OAR - PAC</b>	<b>Pos/BA</b>		<b>13,286</b>	<b>0</b>	<b>20,079</b>	<b>0</b>	<b>20,079</b>	<b>0</b>	<b>26,379</b>	<b>0</b>	<b>6,300</b>
	<b>FTE/OBL</b>	<b>0</b>	<b>17,560</b>	<b>0</b>	<b>20,079</b>	<b>0</b>	<b>20,079</b>	<b>0</b>	<b>26,379</b>	<b>0</b>	<b>6,300</b>
<b>TOTAL OAR</b>	<b>Pos/BA</b>	<b>581</b>	<b>443,807</b>	<b>775</b>	<b>481,977</b>	<b>775</b>	<b>489,031</b>	<b>785</b>	<b>519,789</b>	<b>10</b>	<b>30,758</b>
	<b>FTE/OBL</b>	<b>580</b>	<b>450,889</b>	<b>733</b>	<b>492,789</b>	<b>735</b>	<b>489,031</b>	<b>744</b>	<b>519,789</b>	<b>9</b>	<b>30,758</b>

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		Actuals		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
<b>NATIONAL WEATHER SERVICE (NWS)</b>											
Observations	Pos/BA	683	196,819	844	216,363	973	234,483	973	222,996	0	(11,487)
	FTE/OBL	681	205,849	804	222,755	933	234,483	933	222,996	0	(11,487)
Central Processing	Pos/BA	220	96,086	244	92,871	244	93,357	146	88,388	(98)	(4,969)
	FTE/OBL	219	93,092	232	99,143	232	93,357	134	88,388	(98)	(4,969)
Analyze, Forecast and Support	Pos/BA	2,871	480,406	3,163	496,031	3,052	490,617	3,064	485,931	12	(4,686)
	FTE/OBL	2,863	492,076	3,010	507,894	2,899	490,617	2,908	485,931	9	(4,686)
Dissemination	Pos/BA	70	52,678	86	44,743	86	45,236	86	47,236	0	2,000
	FTE/OBL	70	50,459	82	49,086	82	45,236	82	47,236	0	2,000
Science and Technology Integration	Pos/BA	423	122,921	514	138,826	496	138,835	496	131,956	0	(6,879)
	FTE/OBL	422	134,324	488	146,323	470	138,835	470	131,956	0	(6,879)
<b>TOTAL NWS - ORF</b>	<b>Pos/BA</b>	<b>4,267</b>	<b>948,910</b>	<b>4,851</b>	<b>988,834</b>	<b>4,851</b>	<b>1,002,528</b>	<b>4,765</b>	<b>976,507</b>	<b>(86)</b>	<b>(26,021)</b>
	<b>FTE/OBL</b>	<b>4,255</b>	<b>975,800</b>	<b>4,616</b>	<b>1,025,201</b>	<b>4,616</b>	<b>1,002,528</b>	<b>4,527</b>	<b>976,507</b>	<b>(89)</b>	<b>(26,021)</b>
<b>TOTAL NWS - PAC</b>	<b>Pos/BA</b>	<b>33</b>	<b>132,377</b>	<b>23</b>	<b>135,315</b>	<b>23</b>	<b>135,315</b>	<b>23</b>	<b>142,785</b>	<b>0</b>	<b>7,470</b>
	<b>FTE/OBL</b>	<b>33</b>	<b>183,048</b>	<b>22</b>	<b>151,431</b>	<b>22</b>	<b>135,315</b>	<b>22</b>	<b>142,785</b>	<b>0</b>	<b>7,470</b>
<b>TOTAL NWS</b>	<b>Pos/BA</b>	<b>4,300</b>	<b>1,081,287</b>	<b>4,874</b>	<b>1,124,149</b>	<b>4,874</b>	<b>1,137,843</b>	<b>4,788</b>	<b>1,119,292</b>	<b>(86)</b>	<b>(18,551)</b>
	<b>FTE/OBL</b>	<b>4,288</b>	<b>1,158,848</b>	<b>4,638</b>	<b>1,176,632</b>	<b>4,638</b>	<b>1,137,843</b>	<b>4,549</b>	<b>1,119,292</b>	<b>(89)</b>	<b>(18,551)</b>

\*NWS FY 2016 Obligation amounts are estimates only under the new PPA structure. They reflect carryover from prior years which will be obligated in the PPA in which it was originally ap

**NATIONAL ENVIRONMENTAL SATELLITE, DATA AND INFORMATION SERVICE (NESDIS)**

Environmental Satellite Observing Systems

Office of Satellite and Product	Pos/BA	219	91,991	237	102,000	237	133,246	237	137,674	0	4,428
Operations	FTE/OBL	218	93,910	237	102,398	237	133,246	237	137,674	0	4,428

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		Actuals		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Product Development, Readiness & Application	Pos/BA	68	25,857	88	26,000	88	33,954	88	34,270	0	316
	FTE/OBL	68	24,925	88	26,547	88	33,954	88	34,270	0	316
Commercial Remote Sensing, Licensing and Enforcement	Pos/BA	5	995	6	1,000	6	1,000	7	2,065	1	1,065
	FTE/OBL	5	1,029	6	1,058	6	1,000	7	2,065	1	1,065
Office of Space Commercialization	Pos/BA	3	597	4	600	4	600	5	2,000	1	1,400
	FTE/OBL	3	629	4	602	4	600	5	2,000	1	1,400
Group on Earth Observations (GEO)	Pos/BA	0	497	0	500	0	500	0	500	0	0
	FTE/OBL	0	482	0	516	0	500	0	500	0	0
Total: Environmental Satellite Observing Systems	Pos/BA	295	119,937	335	130,100	335	169,300	337	176,509	2	7,209
	FTE/OBL	294	120,975	335	131,121	335	169,300	337	176,509	2	7,209
National Environmental Information Office	Pos/BA	206	67,626	242	58,986	242	62,217	242	63,478	0	1,261
	FTE/OBL	205	67,951	242	60,325	242	62,217	242	63,478	0	1,261
<b>TOTAL NESDIS - ORF</b>	<b>Pos/BA</b>	<b>501</b>	<b>187,563</b>	<b>577</b>	<b>189,086</b>	<b>577</b>	<b>231,517</b>	<b>579</b>	<b>239,987</b>	<b>2</b>	<b>8,470</b>
	<b>FTE/OBL</b>	<b>499</b>	<b>188,926</b>	<b>577</b>	<b>191,446</b>	<b>577</b>	<b>231,517</b>	<b>579</b>	<b>239,987</b>	<b>2</b>	<b>8,470</b>
<b>TOTAL NESDIS - PAC</b>	<b>Pos/BA</b>	<b>242</b>	<b>2,020,449</b>	<b>312</b>	<b>2,160,270</b>	<b>312</b>	<b>2,121,331</b>	<b>312</b>	<b>2,063,700</b>	<b>0</b>	<b>(57,631)</b>
	<b>FTE/OBL</b>	<b>242</b>	<b>2,029,994</b>	<b>310</b>	<b>2,165,719</b>	<b>310</b>	<b>2,121,331</b>	<b>310</b>	<b>2,063,700</b>	<b>0</b>	<b>(57,631)</b>
<b>TOTAL NESDIS</b>	<b>Pos/BA</b>	<b>743</b>	<b>2,208,012</b>	<b>889</b>	<b>2,349,356</b>	<b>889</b>	<b>2,352,848</b>	<b>891</b>	<b>2,303,687</b>	<b>2</b>	<b>(49,161)</b>
	<b>FTE/OBL</b>	<b>741</b>	<b>2,218,920</b>	<b>887</b>	<b>2,357,165</b>	<b>887</b>	<b>2,352,848</b>	<b>889</b>	<b>2,303,687</b>	<b>2</b>	<b>(49,161)</b>

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**MISSION SUPPORT (MS)**

Coporate Services

Under Secretary and	Pos/BA	111	26,852	147	27,000	0	0	0	0	0	0
Associate Offices	FTE/OBL	111	26,971	140	27,448	0	0	0	0	0	0

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		Actuals		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
NOAA Wide Corporate Services & Agency Management	Pos/BA	589	158,589	716	168,000	0	0	0	0	0	0
	FTE/OBL	584	171,942	679	178,271	0	0	0	0	0	0
IT Security	Pos/BA	0	8,254	0	8,300	0	0	0	0	0	0
	FTE/OBL	0	9,155	0	8,629	0	0	0	0	0	0
Total: Corporate Services	Pos/BA	700	193,695	863	203,300	0	0	0	0	0	0
	FTE/OBL	695	208,068	819	214,348	0	0	0	0	0	0
Office of Education	Pos/BA	22	32,893	25	26,631	0	0	0	0	0	0
	FTE/OBL	22	34,479	23	27,187	0	0	0	0	0	0
Facilities	Pos/BA	34	25,394	47	23,000	0	0	0	0	0	0
	FTE/OBL	34	26,590	45	23,494	0	0	0	0	0	0
Executive Leadership	Pos/BA	0	0	0	0	147	27,266	147	27,266	0	0
	FTE/OBL	0	0	0	0	140	27,266	140	27,266	0	0
Mission Services and Management	Pos/BA	0	0	0	0	752	147,357	797	155,199	45	7,842
	FTE/OBL	0	0	0	0	713	147,357	747	155,199	34	7,842
IT Security	Pos/BA	0	0	0	0	11	10,050	11	10,050	0	0
	FTE/OBL	0	0	0	0	11	10,050	11	10,050	0	0
Payment to the DOC Working Capital Fund	Pos/BA	0	0	0	0	0	70,217	0	72,512	0	2,295
	FTE/OBL	0	0	0	0	0	70,217	0	72,512	0	2,295
Office of Education	Pos/BA	0	0	0	0	25	26,681	25	16,481	0	(10,200)
	FTE/OBL	0	0	0	0	23	26,681	23	16,481	0	(10,200)
<b>TOTAL MISSION SUPPORT - ORF</b>	<b>Pos/BA</b>	<b>756</b>	<b>251,982</b>	<b>935</b>	<b>252,931</b>	<b>935</b>	<b>281,571</b>	<b>980</b>	<b>281,508</b>	<b>45</b>	<b>(63)</b>
	<b>FTE/OBL</b>	<b>751</b>	<b>269,137</b>	<b>887</b>	<b>265,029</b>	<b>887</b>	<b>281,571</b>	<b>921</b>	<b>281,508</b>	<b>34</b>	<b>(63)</b>

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		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
<b>TOTAL MISSION SUPPORT - PAC</b>	Pos/BA	0	0	0	1,000	0	1,000	2	4,557	2	3,557
	FTE/OBL	0	151	0	1,000	0	1,000	2	4,557	2	3,557
<b>Spectrum Relocation Fund -ORF</b>	Pos/BA	0	45,550	0	0	0	0	0	0	0	0
	FTE/OBL	0	108	0	3,262	0	0	0	0	0	0
<b>Spectrum Relocation Fund -PAC</b>	Pos/BA	0	218,103	0	0	0	0	0	0	0	0
	FTE/OBL	0	4,684	0	142,998	0	0	0	0	0	0
<b>TOTAL MISSION SUPPORT</b>	Pos/BA	756	515,635	935	253,931	935	282,571	982	286,065	47	3,494
	FTE/OBL	751	274,080	887	412,289	887	282,571	923	286,065	36	3,494
<b>OFFICE OF MARINE AND AVIATION OPERATIONS (OMAO)</b>											
Marine Operations & Maintenance	Pos/BA	807	174,038	869	178,838	869	182,376	869	184,376	0	2,000
	FTE/OBL	805	176,719	828	181,457	828	182,376	828	184,376	0	2,000
Aviation Operations	Pos/BA	117	31,426	127	32,293	127	32,911	127	32,911	0	0
	FTE/OBL	117	32,505	121	33,402	121	32,911	121	32,911	0	0
<b>TOTAL OMAO - ORF</b>	Pos/BA	924	205,464	996	211,131	996	215,287	996	217,287	0	2,000
	FTE/OBL	922	209,224	949	214,859	949	215,287	949	217,287	0	2,000
<b>TOTAL OMAO - PAC</b>	Pos/BA	0	5,959	6	91,750	6	91,750	6	40,700	0	(51,050)
	FTE/OBL	0	43,060	5	96,618	6	91,750	6	40,700	0	(51,050)
Medicare Eligible Retiree Health Care Fund	Pos/BA	0	1,936	0	1,936	0	1,936	0	1,936	0	0
	FTE/OBL	0	1,336	0	1,936	0	1,936	0	1,936	0	0
NOAA Corps Commissioned Officers Retirement	Pos/BA	0	28,269	0	29,375	0	29,375	0	29,375	0	0
	FTE/OBL	0	26,570	0	29,375	0	29,375	0	29,375	0	0

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**PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS**  
 (Dollar Amounts in Thousands)

Comparison by program/sub-program		FY 2015		FY 2016		FY 2017		FY 2017		Increase/ (Decrease)	
		Actuals		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount		
<b>Recapitalized Research Fleet</b>	Pos/BA	0	0	0	0	0	0	0	[100,000]	0	[100,000]
	FTE/OBL	0	0	0	0	0	0	0	[100,000]	0	[100,000]
<b>TOTAL OMAO</b>	Pos/BA	924	241,628	1,002	334,192	1,002	338,348	1,002	289,298	0	(49,050)
	FTE/OBL	922	280,190	954	342,788	955	338,348	955	289,298	0	(49,050)
<b>NOAA ORF (Discretionary)</b>	Pos/BA	10,862	3,305,641	12,444	3,435,977	12,444	3,549,562	12,468	3,624,344	24	74,782
	FTE/OBL	10,833	3,367,988	11,860	3,561,622	11,867	3,567,062	11,863	3,641,844	(4)	74,782
<b>NOAA PAC (Discretionary)</b>	Pos/BA	277	2,162,745	346	2,399,114	346	2,360,175	348	2,268,821	2	(91,354)
	FTE/OBL	277	2,278,326	342	2,441,654	343	2,373,175	345	2,281,821	2	(91,354)
<b>NOAA Other (Discretionary and Mandatory)</b>	Pos/BA	92	430,843	57	161,125	57	143,517	58	162,517	1	19,000
	FTE/OBL	92	364,519	57	460,129	57	161,311	58	180,311	1	19,000



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**JUSTIFICATION OF PROPOSED LANGUAGE CHANGES**

**JUSTIFICATION OF PROPOSED LANGUAGE CHANGES**

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. Statutes include, but are not limited to, the Endangered Species Act, Marine Mammal Protection Act, Magnuson-Stevens Fishery Conservation and Management Act, National Marine Sanctuaries Act, Oil Pollution Act, Tsunami Warning and Education Act, and Weather Service Organic Act. Examples are agreements and funding arrangements to: perform research on stock assessment and ecosystem processes for conservation and management purposes; perform oceanographic surveys to determine baseline for Oil Pollution Act purposes; perform research and development on oil spill response; and perform research on endangered species for purposes of ESA consultation, or on marine mammals for MMPA Incidental Harassment Authorizations, to inform permitting of infrastructure projects, oil and gas drilling or other regulated activities. This provision also authorizes agreements and funding arrangements for the placement of scientific equipment on bridges and piers, educational kiosks in public places, use of piers, vessels, storage, freezer space, and warehouses for mission needs, and use of universities' and public organizations' laboratory and other space to increase collaboration.

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1. For necessary expenses of activities authorized by law for the National Oceanic and Atmospheric Administration,

5 USC 5348	15 USC 1511 b-e	16 USC 4101 et seq.	33 USC 2801 et seq.	
5 USC 4703	15 USC 1514	16 USC 4701 et seq.	33 USC 3001 et seq.	
7 USC 1622	15 USC 1517	16 USC 5001 et seq.	33 USC 3044 et seq.	
10 USC 1072	15 USC 1537-40	31 USC 1105	33 USC 3045	
10 USC 1111-1115	16 USC 661 et seq.	33 USC 706 et seq.	33 USC 3046	
10 USC 2311	16 USC 757a et seq.	33 USC 883 a-i et seq. as	33 USC 4001	
12 USC 1715m	16 USC 1361	33 USC 891 et seq.	33 USC 3402	
15 USC 313	16 USC 1431 et seq.	33 USC 893 a-b,	33 USC 3501	
15 USC 313a	16 USC 1447a et seq.	as amended	33 USC 3603	
15 USC 313b	16 USC 1451 et seq.	33 USC 1121-1131	33 USC 3703	
15 USC 313nt	16 USC 1456a	33 USC 1251	42 USC 8902-05	
15 USC 325	16 USC 1456-1	33 USC 1321	42 USC 9601 et seq.	
15 USC 330b	16 USC 1531 et seq.	33 USC 1441-44	43 USC 1347e	
15 USC 330e	16 USC 1801 et seq.	33 USC 2706	44 USC 1307	
	16 USC 3645	33 USC 2712	49 USC 44720	

**Government Organization and Employees**

5 USC 5348 - Crews of Vessels

“...the pay of officers and members of crews of vessels excepted from chapter 51 of this title by section 5102(c)(8) of this title shall be fixed and adjusted from time to time as nearly as is consistent with the public interest in accordance with prevailing rates and practices in the maritime industry.”

5 USC 4703- Demonstration Projects

“...the Office of Personnel Management may, directly or through agreement or contract with one or more agencies and other public and private organizations, conduct and evaluate demonstration projects.”

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**Agriculture**

7 USC 1622 - Distribution and Marketing of Agricultural Products

“The Secretary ... is directed and authorized: ...

- (a) to determine the needs and develop or assist in the development of plans for the proper assembly, processing, transportation, storage, distribution, and handling of agricultural (fish) products.
- (f) to conduct and cooperate in consumer education for the more effective utilization and greater consumption of agricultural products (fish)...
- (g) to collect and disseminate marketing information... for the purpose of ... bringing about a balance between production and utilization of agricultural (fish) products.
- (h) to inspect, certify, and identify the class, quality, quantity and condition of agricultural (fish) products ...
- (m) to conduct ... research ... to determine the most efficient ... processes for the handling, storing, preserving, protecting...of agricultural (fish) commodities ...”

(h) - Duties of Secretary relating to agricultural products; penalties

“Whoever knowingly shall falsely make, issue, alter, forge, or counterfeit any official certificate, memorandum, or other identification, with respect to inspection, class, grade, quality, size, quantity, or condition, issued or authorized under this section or knowingly cause or procure, or aid, assist in, or be a party to, such false making, issuing, altering, forging, or counterfeiting, or whoever knowingly shall possess, without promptly notifying the Secretary (of Commerce) or his representative, utter, published, or used as true, any such falsely made, altered forged, or counterfeited official certificate, memorandum, mark, identification, or device, or whoever knowingly represents that an agricultural product has been officially inspected or graded...when in fact such commodity has not been so graded or inspected shall be fined not more than \$1,000 or imprisoned not more than one year, or both.”

**Armed Forces**

10 USC 1072 Medical and Dental Care

“...The term “uniformed services” means the armed forces and the Commissioned Corps of the National Oceanic and Atmospheric Administration and of the Public Health Service.”

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10 USC 1111-1115 Determinations of Contributions to the Fund

PL 108-375, Sec. 725 Revised funding methodology for military retiree health care benefits states: "At the beginning of each fiscal year after September 30, 2005, the Secretary of the Treasury shall promptly pay into the Fund from the General Fund of the Treasury--(1) the amount certified to the Secretary by the Secretary of Defense under subsection (c), which shall be the contribution to the Fund for that fiscal year required by section 1115; and (2) the amount determined by each administering Secretary under section 1111(c) as the contribution to the Fund on behalf of the members of the uniformed services under the jurisdiction of that Secretary."

10 USC 2311 Assignment and Delegation of Procurement Functions and Responsibilities

- (a) In General.--Except to the extent expressly prohibited by another provision of law, the head of an agency may delegate, subject to his direction, to any other officer or official of that agency, any power under this chapter.
- (b) Procurements For or With Other Agencies.--Subject to subsection (a), to facilitate the procurement of property and services covered by this chapter by each agency named in section 2303 of this title for any other agency, and to facilitate joint procurement by those agencies--
  - (1) the head of an agency may delegate functions and assign responsibilities relating to procurement to any officer or employee within such agency;
  - (2) the heads of two or more agencies may by agreement delegate procurement functions and assign procurement responsibilities from one agency to another of those agencies or to an officer or civilian employee of another of those agencies; and
  - (3) the heads of two or more agencies may create joint or combined offices to exercise procurement functions and responsibilities.

**Banks and Banking**

12 USC 1715m - Mortgage Insurance for Servicemen [NOAA Corps]

This section authorizes payment of Federal Housing Administration (FHA) home mortgage insurance premiums to NOAA Corps Officers.

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**Commerce and Trade**

15 USC 313 - Duties of Secretary of Commerce [National Weather Service]

“The Secretary of Commerce...shall have charge of the forecasting of weather,...issue of storm warnings,...weather and flood signals,...gauging and reporting of rivers,...collection and transmission of marine intelligence...reporting of temperature and rainfall conditions..., the display of frost and cold-wave signals, the distribution of meteorological information..., and the taking of such meteorological observations as may be necessary to establish and record the climatic conditions of the United States, or as are essential for the proper execution of the foregoing duties.”

15 USC 313a - Establishment of Meteorological Observation Stations in the Arctic Region

“... The Secretary of Commerce shall ... take such actions as may be necessary in the development of an international basic meteorological reporting network in the Arctic region of the Western Hemisphere...”

15 USC 313b - Institute for Aviation Weather Prediction

“The Administrator of the National Oceanic and Atmospheric Administration shall establish an Institute for Aviation Weather Prediction. The Institute shall provide forecasts, weather warnings, and other weather services to the United States aviation community....”

15 USC 313 note - Weather Service Modernization Act (a)

As part of the budget justification documents submitted to Congress in support of the annual budget request for the department of Commerce, the Secretary shall include a National Implementation Plan for modernization of the National Weather Service for each fiscal year following fiscal year 1993 until such modernization is complete. The Plan shall set forth the actions, during the 2-year period beginning with the fiscal year for which the budget request is made, that will be necessary to accomplish the objectives described in the Strategic Plan.

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15 USC 325 - Spending Authority for the National Weather Service

“...Appropriations now or hereafter provided for the National Weather Service shall be available for: (a) furnishing food and shelter...to employees of the Government assigned to Arctic stations; (b) equipment and maintenance of meteorological offices and stations, and maintenance and operation of meteorological facilities outside the United States... (c) repairing, altering, and improving of buildings occupied by the National Weather Service, and care and preservation of grounds...(d) arranging for communication services... and (e) purchasing tabulating cards and continuous form tabulating paper .

15 USC 330b - Duties of Secretary relating to Weather Modification Activities or Attempts - Reporting Requirement

“The Secretary shall maintain a record of weather modification activities, including attempts, which take place in the United States and shall publish summaries thereof from time to time as he determines.”

- (a) “All reports, documents, and other information received by the Secretary under the provisions of this chapter shall be made available to the public to the fullest practicable extent.”

15 USC 330e - Authorization of Appropriations relating to Weather Modification Activities or Attempts - Reporting Requirement

This section provides funding authority to support the reporting requirements specified in this chapter.

15 USC 1511b - United States Fishery Trade Officers

“For purposes of carrying out export promotion and other fishery development responsibilities, the Secretary of Commerce...shall appoint not fewer than six officers who shall serve abroad to promote United States fishing interests. These officers shall be knowledgeable about the United States fishing industry, preferably with experience derived from the harvesting, processing, or marketing sectors of the industry or from the administration of fisheries programs. Such officers, who shall be employees of the Department of Commerce, shall have the designation of fishery trade officers.”

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15 USC 1511c - NOAA Estuarine Programs Office

“... The Estuarine Programs Office shall develop, coordinate, and implement the estuarine activities of the administration with the activities of other Federal and State agencies. There are authorized to be appropriated to the Administration not to exceed \$560,000 for fiscal year 1989, and \$600,000 for fiscal year 1990.”

15 USC 1511d - Chesapeake Bay Office

The Secretary of Commerce shall establish, within the National Oceanic and Atmospheric Administration, an office to be known as the Chesapeake Bay Office...which shall provide technical assistance on processes impacting the Chesapeake Bay system, its restoration and habitat protection; develop a strategy to meet the commitments of the Chesapeake Bay Agreement; and coordinate programs and activities impacting the Chesapeake Bay, including research and grants.

15 USC 1514 - Basic Authority for Performance of Certain Functions and Activities of Department

“Appropriations are authorized for the following activities of the Department of Commerce:

- (a) furnishing to employees...and their dependents, in Alaska and other points outside the continental United States, free emergency medical services...and supplies;
- (b) purchasing, transporting, storing, and distributing food and other subsistence supplies for resale to employees...and their dependents, in Alaska and other points outside the continental United States at a reasonable value...; the proceeds from such resales to be credited to the appropriation from which the expenditure was made;
- (c) ...establishment, maintenance, and operation of messing facilities, by contract or otherwise, in Alaska and other points outside the continental United States..., such service to be furnished to employees...and their dependents,...
- (d) reimbursement...of officers or employees in or under the Department...for food, clothing, medicines, and other supplies furnished by them in emergencies for the temporary relief of dislocated persons in remote localities;
- (e) providing motion-picture equipment and film for recreation of crews of vessels..., for recreation for employees in remote localities..., and for training purposes;
- (f) erecting, altering, repairing, equipping, furnishing, and maintaining...such living and working quarters and facilities as may be necessary to carry out its authorized work at remote localities not on foreign soil where such living and working accommodations are not otherwise available.”

15 USC 1517 - Transfer of Statistical or Scientific Work

“The President is authorized, by order in writing, to transfer at any time the whole or any part of any office, bureau, division, or other branch of the public service engaged in statistical or scientific work, from the Department of State, the Department of the Treasury, the Department of Defense, the Department of Justice, the United States Postal Service, or the Department of the Interior, to the Department of Commerce; and in every such case the duties and authority performed by and conferred by law upon such office, bureau, division, or other branch of the public service, or the part thereof so transferred, shall be thereby transferred with such office,



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bureau, division, or other branch of the public service, or the part thereof which is so transferred. All power and authority conferred by law, both supervisory and appellate, upon the department from which such transfer is made, or the Secretary thereof, in relation to the said office, bureau, division, or other branch of the public service, or the part thereof so transferred, shall immediately, when such transfer is so ordered by the President, be fully conferred upon and vested in the Department of Commerce, or the Secretary thereof, as the case may be, as to the whole or part of such office, bureau, division, or other branch of the public service so transferred.”

15 USC 1537 Needs Assessment for Data Management

“Not later than 12 months after October 29, 1992, and at least biennially thereafter, the Secretary of Commerce shall complete an assessment of the adequacy of the environmental data and information systems of NOAA.”

15 USC 1538 – Notice of reprogramming

**(a) In general**

The Secretary of Commerce shall provide notice to the Committee on Commerce, Science, and Transportation and Committee on Appropriations of the Senate and to the Committee on Merchant Marine and Fisheries, Committee on Science, Space, and Technology, and Committee on Appropriations of the House of Representatives, not less than 15 days before reprogramming funds available for a program, project, or activity of the National Oceanic and Atmospheric Administration in an amount greater than the lesser of \$250,000 or 5 percent of the total funding of such program, project, or activity if the reprogramming-

- (1) augments an existing program, project, or activity;
- (2) reduces by 5 percent or more (A) the funding for an existing program, project, or activity or (B) the numbers of personnel therefor as approved by Congress; or
- (3) results from any general savings from a reduction in personnel which would result in a change in an existing program, project, or activity.

**(b) Notice of reorganization**

The Secretary of Commerce shall provide notice to the Committees on Merchant Marine and Fisheries, Science, Space, and Technology, and Appropriations of the House of Representatives, and the Committees on Commerce, Science, and Transportation and Appropriations of the Senate not later than 15 days before any major reorganization of any program, project, or activity of the National Oceanic and Atmospheric Administration.

15 USC 1539 – Financial Assistance

**(a) Processing of applications**

Within 12 months after October 29, 1992, the Secretary of Commerce shall develop and, after notice and opportunity for public comment, promulgate regulations or guidelines to ensure that a completed application for a grant, contract, or other financial assistance

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under a nondiscretionary assistance program shall be processed and approved or disapproved within 75 days after submission of the application to the responsible program office of the National Oceanic and Atmospheric Administration.

**(b) Notification of applicant**

Not later than 14 days after the date on which the Secretary of Commerce receives an application for a contract, grant, or other financial assistance provided under a nondiscretionary assistance program administered by the National Oceanic and Atmospheric Administration, the Secretary shall indicate in writing to the applicant whether or not the application is complete and, if not complete, shall specify the additional material that the applicant must provide to complete the application.

**(c) Exemption**

In the case of a program for which the recipient of a grant, contract, or other financial assistance is specified by statute to be, or has customarily been, a State or an interstate fishery commission, such financial assistance may be provided by the Secretary to that recipient on a sole-source basis, notwithstanding any other provision of law.

**(d) “Nondiscretionary assistance program” defined**

In this section, the term “nondiscretionary assistance program” means any program for providing financial assistance—

- (1)** under which the amount of funding for, and the intended recipient of, the financial assistance is specified by Congress; or
- (2)** the recipients of which have customarily been a State or an interstate fishery commission.

15 USC 1540 – Cooperative Agreements

“The Secretary of Commerce, acting through the Under Secretary of Commerce for Oceans and Atmosphere, may enter into cooperative agreements and other financial agreements with any nonprofit organization to (1) aid and promote scientific and educational activities to foster public understanding of the National Oceanic and Atmospheric Administration or its programs; and (2) solicit private donations for the support of such activities.”

**Conservation**

16 USC 46a - Marine Fisheries Program Authorization Act

This Act authorizes NMFS fisheries programs not otherwise authorized by law, including research to reduce entanglement of marine mammals in fishing gear, development of habitat restoration techniques, restoration of Chesapeake Bay, and conservation of Antarctic living marine resources.

16 USC 661 et seq.- Declaration of Purpose; Cooperation of Agencies; Surveys and Investigations; Donations

“...the Secretary of the Interior is authorized (1) to provide assistance to, and cooperate with, Federal, State, and public or private agencies and organizations in the development, protection, rearing, and stocking of all species of wildlife, resources thereof, and their habitat, in controlling losses of the same from disease or other causes, in minimizing damages from overabundant species, in providing public shooting and fishing areas, including easements across public lands for access thereto, and in carrying out other measures

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necessary to effectuate the purposes of said sections; (2) to make surveys and investigations of the wildlife of the public domain, including lands and waters or interests therein acquired or controlled by any agency of the United States; and (3) to accept donations of land and contributions of funds in furtherance of the purposes of said sections.”

16 USC 757a et seq.- Anadromous, Great Lakes, and Lake Champlain Fisheries

The Act authorizes cooperative agreements with States “that are concerned with the development, conservation, and enhancement of [anadromous] fish” (section 757a(a)).

16 USC 1361 - Congressional Findings

“The Congress finds that - (1) certain species and population stocks of marine mammals are, or may be, in danger of extinction or depletion as a result of man's activities;”

“The Secretary is authorized to make grants, or to provide financial assistance in such other form as he deems appropriate, to any Federal or State agency, public or private institution, or other person for the purpose of assisting such agency, institution, or person to undertake research in subjects which are relevant to the protection and conservation of marine mammals, and shall provide financial assistance for, research into new methods of locating and catching yellow-fin tuna without the incidental taking of marine mammals.”

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16 USC 1431 et seq. - Findings, Purposes, and Policies [The National Marine Sanctuaries Act, as amended]

(b) Purposes and Policies

“The purposes and policies of this title are -

- (1) to identify and designate as national marine sanctuaries areas of the marine environment which are of special national significance;
- (2) to provide authority for ... conservation and management of these marine areas ...
- (3) to support, promote, and coordinate scientific research on, and monitoring of, the resources of these marine areas...
- (4) to enhance public awareness, understanding, appreciation, and wise use of the marine environment;
- (5) to facilitate to the extent compatible with the primary objective of resource protection, all public and private uses of the resources of these marine areas not prohibited pursuant to other authorities;
- (6) to develop and implement coordinated plans for the protection and management of these areas...;
- (7) to create models of, and incentives for, ways to conserve and manage these areas...”
- (8) to cooperate with global programs ...; and
- (9) to maintain, restore, and enhance living resources ...”

16 USC 1447a et seq. - Regional Marine Research Programs

Authorizes NOAA/EPA and Governors of certain states to appoint members to a number of regional marine research boards. Each board is to develop a comprehensive four year marine research plan and “the Administrator of the National Oceanic and Atmospheric Administration shall administer a grant program to support the administrative functions of each Board.”

Authorization for the Boards expires on October 1, 1999. The authorization for appropriations expired at the end of fiscal year 1996.

16 USC 1451 et seq. - Findings, Purposes, and Policies [Coastal Zone Management Act]

Establishes a voluntary partnership between the Federal Government and coastal States. It also establishes the National Estuarine Reserve Research program, in which the Secretary of Commerce may designate an estuarine area as a national estuarine research reserve in consultation with governor of affected state.

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16 USC 1456a – Coastal Zone Management Fund

“(b) (1) The Secretary shall establish and maintain a fund, to be known as the ‘Coastal Zone Management Fund’, which shall consist of amounts retained and deposited into the Fund under subsection (a) of this section and fees deposited into the Fund under section 1456 (i) (3) of this title”

16 USC 1456-1 – Coastal and Estuarine Land Conservation Program

Amends the Coastal Zone Management Act of 1972 to authorize the Secretary of Commerce to conduct a Coastal and Estuarine Land Conservation Program to protect important coastal and estuarine areas. Requires related property acquisition grants to coastal states with approved coastal zone management plans or National Estuarine Research Reserve units. Authorizes appropriations.

16 USC 1531 et seq. – Congressional Findings and Declaration of Purposes and Policy

The purposes of the Act are “to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in [the statute]” (section 1531(b)).

16 USC 1801 et seq. - Magnuson-Stevens Fishery Conservation and Management Act

The primary purpose of the Act is “to take immediate action to conserve and manage the fishery resources found off the coasts of the United States (section 1801(b)(1)).”

16 USC 3645 - Pacific Coastal Salmon Recovery

“(A) For salmon habitat restoration, salmon stock enhancement, and salmon research, including the construction of salmon research and related facilities, there is authorized to be appropriated for each of fiscal years 2000, 2001, 2002, and 2003, \$90,000,000 to the States of Alaska, Washington, Oregon, and California. Amounts appropriated pursuant to this subparagraph shall be made available as direct payments. The State of Alaska may allocate a portion of any funds it receives under this subsection to eligible activities outside Alaska.”

Amended in PL109-479 Section 302(d) as follows: Section 16(d)(2)(A) of the Pacific Salmon Treaty, as transferred by paragraph (1), is amended—

- (1) by inserting “sustainable salmon fisheries,” after “enhancement,”;
- (2) by inserting “2005, 2006, 2007, 2008, and 2009,” after “2003”; and
- (3) by inserting “Idaho,” after “Oregon,”.

16 USC 4101 et seq. – Interjurisdictional Fisheries

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“The purposes of this chapter are - (1) to promote and encourage State activities in support of the management of interjurisdictional fishery resources, and (2) to promote and encourage management of interjurisdictional fishery resources through their range” (3) to promote and encourage research in preparation for the implementation of the use of ecosystems and interspecies approaches to the conservation and management of interjurisdictional fishery resources throughout their range.”

16 USC 4701 et seq. - Aquatic Nuisance Prevention and Control

Establishes an interagency Aquatic Nuisance Species Task Force, of which the Administrator of NOAA is a co-chair. The task force’s responsibilities include developing and implementing “a program for waters of the United States to prevent introduction and dispersal of aquatic nuisance species; to monitor, control and study such species; and to disseminate related information.”

16 USC 5001 et seq. - Purpose of Convention

“It is the purpose ... to implement the Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean, signed in Moscow, February 11, 1992.”

**Money and Finance**

31 USC 1105 - Budget Contents and Submission to Congress

(a) On or after the first Monday in January but not later than the first Monday in February of each year, the President shall submit a budget of the United States Government for the following fiscal year. Each budget shall include a budget message and summary and supporting information.

Amended in PL108-447 (FY 2005 Omnibus Appropriations Act) as follows: “*Provided further*, That beginning in fiscal year 2006 and for each fiscal year thereafter, the Secretary of Commerce shall include in the budget justification materials that the Secretary submits to Congress in support of the Department of Commerce budget (as submitted with the budget of the President under section 1105(a) of title 31, 10 United States Code) an estimate for each National Oceanic and Atmospheric Administration procurement, acquisition and construction program having a total multiyear program cost of more than \$5,000,000 and simultaneously the budget justification materials shall include an estimate of the budgetary requirements for each such program for each of the 5 subsequent fiscal years.”

**Navigation and Navigable Waters**

33 USC 706 et seq. - Department of Commerce; Current Precipitation Information; Appropriation

“There is authorized an expenditure as required,..., for the establishment, operation, and maintenance by the Secretary of Commerce of a network of recording and non-recording precipitation stations, known as the Hydroclimatic Network, whenever...such service is advisable...”

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33 USC 883a et seq. - Surveys and Other Activities

“...the Secretary...is authorized to conduct the following activities:

- (1) Hydrographic and topographic surveys;
- (2) Tide and current observations;
- (3) Geodetic-control surveys;
- (4) Field surveys for aeronautical charts;
- (5) Geomagnetic, seismological, gravity, and related geophysical measurements and investigations, and observations ...”

33 USC 883b - Dissemination of Data; Further Activities

“...the Secretary is authorized to conduct the following activities:

- (1) Analysis and prediction of tide and current data;
- (2) Processing and publication of data...;
- (3) Compilation and printing of nautical charts...;
- (4) Distribution of nautical charts...”

33 USC 883c - Geomagnetic Data; Collection; Correlation, and Dissemination

“To provide for the orderly collection of geomagnetic data...the Secretary ... is authorized to collect, correlate, and disseminate such data.”

33 USC 883d - Improvement of Methods, Instruments, and Equipments; Investigations and Research

“...the Secretary ... is authorized to conduct developmental work for the improvement of surveying and cartographic methods, instruments, and equipments; and to conduct investigations and research in geophysical sciences...”

33 USC 883e - Cooperative Agreements for Surveys and Investigations; Contribution of Costs Incurred by National Oceanic and Atmospheric Administration

“(1) The Secretary of Commerce is authorized to enter into cooperative agreements with, and to receive and expand funds made available by... for surveys or investigations... or for performing related surveying and mapping activities... and for the preparation and publication of the results thereof.”

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“(2) The Secretary of Commerce is authorized to establish the terms of any cooperative agreement entered into ... including the amount of funds to be received ... which the Secretary determines represents the amount of benefits derived ... from the cooperative agreement.”

33 USC 883f - Contracts with Qualified Organizations

“The Secretary is authorized to contract with qualified organizations for the performance of any part of the authorized functions of the National Ocean Survey...”

33 USC 883h - Employment of Public Vessels

“The President is authorized to cause to be employed such of the public vessels as he deems it expedient to employ, and to give such instructions for regulating their conduct as he deems proper in order to carry out the provisions of this subchapter.”

33 USC 883i - Authorization of Appropriations

“There are hereby authorized to be appropriated such funds as may be necessary to acquire, construct, maintain, and operate ships, stations, equipment, and facilities and for such other expenditures, including personal services at the seat of government and elsewhere and including the erection of temporary observatory buildings and lease of sites therefore as may be necessary...”

33 USC 891 et seq. - Fleet Replacement and Modernization Program

“The Secretary is authorized to implement... a 15-year program to replace and modernize the NOAA fleet.”

33 USC 893 et seq. - Research, Development, and Education

“The Administrator...shall establish a coordinated program of ocean, coastal, Great Lakes, and atmospheric research and development...that shall focus on the development of advanced technologies and analytical methods that will promote United States leadership in ocean and atmospheric science and competitiveness in the applied uses of such knowledge.”

33 USC 1121-1124, 1126-1129, 1131 - National Sea Grant College Program Act

The Sea Grant Act authorizes the awarding of grants and contracts to initiate and support programs at Sea Grant colleges and other institutions for research, education, and advisory services in any field related to the conservation and development of marine resources.

33 USC 1251- Water Pollution Prevention and Control

Through the National Shellfish Indicator Program, authorizes the Secretary of Commerce, in cooperation with the Secretary of Health and Human Services and the Administrator of EPA, to establish and administer a 5-year national shellfish research program for the



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purpose of improving existing classification systems for shellfish growing waters using the latest technological advancements in microbiology and epidemiological methods.

33 USC 1321 - Oil and Hazardous Substances [Clean Water Act]

Authorizes the recovery of damages to natural resources in the event of an oil spill in waters of the United States. This authority has been delegated to several Federal agencies, including the Department, pursuant to an Executive Order.

33 USC 1441 - Monitoring and Research Program [Marine Protection, Research and Sanctuaries Act]

Authorizes the Secretary of Commerce, in coordination with other agencies, to initiate a comprehensive and continuing program of monitoring and research regarding the effects of the dumping of material into ocean waters or other coastal waters where the tide ebbs and flows or into the Great Lakes or their connecting waters.

33 USC 1442 - Research Program Respecting Possible Long-range Effects of Pollution, Overfishing, and Man-induced Changes of Ocean Ecosystems

Authorizes the Secretary of Commerce, in consultation with other agencies, to ... “initiate a comprehensive and continuing program of research with respect to the possible long-range effects of pollution, overfishing, and man-induced changes of ocean ecosystems.”

33 USC 1443 - Regional Management Plans for Waste Disposal in Coastal Areas

Authorizes the Secretary of Commerce to assist the Environmental Protection Agency in assessing “the feasibility in coastal areas of regional management plans for the disposal of waste materials.”

33 USC 1444 - Annual Report

Requires the Secretary of Commerce to provide Congress with an annual report on the Department’s activities to monitor ocean dumping and research the long-range effects of pollution on ocean ecosystems.

33 USC 2706 - Natural Resources [NOAA Oil and Hazardous Substance Spill Cost Reimbursement]

“...the National Oceanic and Atmospheric Administration acts as trustee of said marine environment and/or resources, shall be deposited in the Damage Assessment and Restoration Revolving Fund ... for purposes of obligation and expenditure in fiscal year 1991 and thereafter, sums available in the Damage Assessment and Restoration Revolving Fund may be transferred, upon the approval of the Secretary ..., to the Operations, Research, and Facilities appropriation of the National Oceanic and Atmospheric Administration.”

33 USC 2712 – Use of Oil Spill Liability Trust Fund

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Amends Section 1012(a)(5) of the Oil Spill Liability Trust Fund Act by: “(2) by inserting after subparagraph (A) the following:“(B) not more than \$15,000,000 in each fiscal year shall be available to the Under Secretary of Commerce for Oceans and Atmosphere for expenses incurred by, and activities related to, response and damage assessment capabilities of the National Oceanic and Atmospheric Administration.”

33 USC 2801 et seq. - National Coastal Monitoring Act

“The purposes of this chapter are to -

- (1) establish a comprehensive national program for consistent monitoring of the Nation's coastal ecosystems;
- (2) establish long-term water quality assessment and monitoring programs for high priority coastal waters that will enhance the ability of Federal, State, and local authorities to develop and implement effective remedial programs for those waters;
- (3) establish a system for reviewing and evaluating the scientific, analytical, and technological means that are available for monitoring the environmental quality of coastal ecosystems;
- (4) establish methods for identifying uniform indicators of coastal ecosystem quality;
- (5) provide for periodic, comprehensive reports to Congress concerning the quality of the Nation's coastal ecosystems;
- (6) establish a coastal environment information program to distribute coastal monitoring information;
- (7) provide state programs authorized under the Coastal Zone Management Act of 1972 (16 U.S.C. 1451 et seq.) with information necessary to design land use plans and coastal zone regulations that will contribute to the protection of coastal ecosystems; and
- (8) provide certain water pollution control programs authorized under the Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.) with information necessary to design and implement effective coastal water pollution controls.”

33 USC 3001 et seq.- NOAA Corps Officers

PL 108-219 states: “All action in the line of duty by, and all Federal agency actions in relation to (including with respect to pay, benefits, and retirement) a de facto officer of the commissioned corps of the National Oceanic and Atmospheric Administration who was appointed or promoted to that office without Presidential action, and without the advice and consent of the Senate, during such time as the officer was not properly appointed in or promoted to that office, are hereby ratified and approved if otherwise in accord with the law, and the President alone may, without regard to any other law relating to appointments or promotions in such corps, appoint or promote such a de facto officer temporarily, without change in the grade currently occupied in a de facto capacity, as an officer in such corps for a period ending not later than 180 days from the date of enactment of this Act.”

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33 USC 3044 et seq. -Retirement for Length of Service

An officer who has completed 20 years of service, of which at least 10 years was service as a commissioned officer, may at any time thereafter, upon application by such officer and in the discretion of the President, be placed on the retired list.

33 USC 3045 - Computation of Retired Pay

(a) Officers first becoming members before September 8, 1980: Each officer on the retired list who first became a member of a uniformed service before September 8, 1980, shall receive retired pay at the rate determined by multiplying (1) the retired pay base determined under section 1406(g) of title 10; by (2) 2 ½ percent of the number of years of service that may be credited to the officer under section 1405 of such title as if the officer's service were service as a member of the Armed Forces. The retired pay so computed may not exceed 75 percent of the retired pay base. (b) Officers first becoming members on or after September 8, 1980. Each officer on the retired list who first became a member of a uniformed service on or after September 8, 1980, shall receive retired pay at the rate determined by multiplying (1) the retired pay base determined under section 1407 of title 10; by (2) the retired pay multiplier determined under section 1409 of such title for the number of years of service that may be credited to the officer under section 1405 of such title as if the officer's service were service as a member of the Armed Forces. (c) Treatment of full and fractional parts of months in computing years of service (1) In general, in computing the number of years of service of an officer for the purposes of subsection (a) of this section - (A) each full month of service that is in addition to the number of full years of service creditable to the officer shall be credited as 1/12 of a year; and (B) any remaining fractional part of a month shall be disregarded. (2) Rounding Retired pay computed under this section, if not a multiple of \$1, shall be rounded to the next lower multiple of \$1."

33 USC 3046 - Retired Grade and Retired Pay

Each officer retired pursuant to law shall be placed on the retired list with the highest grade satisfactorily held by that officer while on active duty including active duty pursuant to recall, under permanent or temporary appointment, and shall receive retired pay based on such highest grade, if - (1) the officer's performance of duty in such highest grade has been satisfactory, as determined by the Secretary of the department or departments under whose jurisdiction the officer served; and (2) unless retired for disability, the officer's length of service in such highest grade is no less than that required by the Secretary of officers retiring under permanent appointment in that grade.

33 USC 4001 - Harmful Algal Bloom and Hypoxia Research and Control Amendments Act of 2014

The President, through the Committee on Environment and Natural Resources of the National Science and Technology Council, shall establish an Inter-Agency Task Force on Harmful Algal Blooms and Hypoxia. The Task Force shall consist of a representative from—the Department of Commerce (who shall serve as Chairman of the Task Force) among others.

33 USC 3402 – Coordinated National Ocean Exploration Program

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The Administrator of the National Oceanic and Atmospheric Administration shall, in consultation with the National Science Foundation and other appropriate Federal agencies, establish a coordinated national ocean exploration program within the National Oceanic and Atmospheric Administration that promotes collaboration with other Federal ocean and undersea research and exploration programs. To the extent appropriate, the Administrator shall seek to facilitate coordination of data and information management systems, outreach and education programs to improve public understanding of ocean and coastal resources, and development and transfer of technologies to facilitate ocean and undersea research and exploration.

33 USC 3501 – Ocean and Coastal Mapping Integration

Directs the President to establish a coordinated federal program to develop an ocean and coastal mapping plan for the Great Lakes and coastal state waters, the territorial sea, the exclusive economic zone, and the continental shelf of the United States that enhances ecosystem approaches in decision-making for conservation and management of marine resources and habitats, establishes research and mapping priorities, supports the siting of research and other platforms, and advances ocean and coastal science. Requires a plan for an integrated ocean and coastal mapping initiative within NOAA. Authorizes appropriations.

33 USC 3603 – Integrated Coastal and Ocean Observing System

Directs the President to establish a National Integrated Coastal and Ocean Observation System that is designed to address regional and national needs for ocean information, to gather specific data on key coastal, ocean, and Great Lakes variables, and to ensure timely and sustained dissemination and availability of such data. Requires an advisory committee. Authorizes appropriations.

33 USC 3703 – Federal Ocean Acidification Research and Monitoring

the Joint Subcommittee on Ocean Science and Technology of the National Science and Technology Council to: (1) coordinate federal activities on ocean acidification and establish an interagency working group; and (2) develop a strategic plan for federal research and monitoring on ocean acidification. Requires specified ocean acidification programs in NOAA, the National Science Foundation (NSF), and the National Aeronautics and Space Administration (NASA). Authorizes appropriations.

**The Public Health and Welfare**

42 USC 8902-8905 - Acid Precipitation Program

Authorized the Administrator of NOAA to serve as co-chair of a task force to prepare a comprehensive research plan for a program to study the causes and effects of acid precipitation. Also authorizes the Administrator of NOAA to serve as the director of a related research program.

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42 USC 9601 et seq. (CERCLA)

Through associated regulations and delegations, authorizes the Administrator to provide technical assistance to the Administrator, EPA, for hazardous waste response under CERCLA and the National Contingency Plan and authorizes the Administrator to act as a natural resource trustee with authority to bring a cause of action for damages resulting from an injury to, destruction of or loss of resources under NOAA's jurisdiction.

**Public Lands**

43 USC 1347e - Safety and Health Regulations

Authorizes the Secretary of Commerce in cooperation with other Federal entities, to conduct studies of underwater diving techniques and equipment "suitable for protection of human safety and improvement of diver performance...."

**Public Printing and Documents**

44 USC 1307 - Sale and Distribution of NOAA Nautical and Aeronautical Products

"All nautical and aeronautical products created or published ... shall be sold at ... prices ... the Secretary of Commerce shall establish annually ... so as to recover all costs attributable to data base management, compilation, printing, and distribution of such products."

**Transportation**

49 USC 44720 - Meteorological services

The Administrator of the Federal Aviation Administration shall make recommendations to the Secretary of Commerce on providing meteorological services necessary for the safe and efficient movement of aircraft in air commerce. In providing the services, the Secretary shall cooperate with the Administrator and give complete consideration to those recommendations.

"To promote safety and efficiency in air navigation to the highest possible degree, the Secretary shall -(1)observe, measure, investigate, and study atmospheric phenomena, and maintain meteorological stations and offices...(2) provide reports to the Administrator (3)cooperate with persons engaged in air commerce in meteorological services...(4)maintain and coordinate international exchanges of meteorological information... (5) participate in developing an international basic meteorological reporting network...(6)coordinate meteorological requirements in the United States to maintain standard observations...;(7)promote and develop meteorological science...."

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**National and Commercial Space Programs**

51 USC 50702 - Office of Space Commerce

“There is established with the Department of Commerce an Office of Space Commerce” which shall “(1) to foster the conditions for the economic growth and technological advancement of the United States space commerce industry; (2) to coordinate space commerce policy issues and actions within the Department of Commerce; (3) to represent the Department of Commerce in the development of United States policies and in negotiations with foreign countries to promote United States space commerce; (4) to promote the advancement of United States geospatial technologies related to space commerce, in cooperation with relevant interagency working groups; and (5) to provide support to Federal Government organizations working on Space-Based Positioning Navigation, and Timing policy, including the National Coordination Office for Space-Based Position, Navigation, and Timing.”

## Research and Development (R&D) Investments

The NOAA FY 2017 Budget estimates for R&D investments are the result of an integrated requirements-based strategic planning process. This process provides the structure to link NOAA's strategic vision with programmatic detail and budget development, with the goal of maximizing resources while optimizing capabilities.

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

NOAA requests \$612 million for investments (excluding equipment and facilities) in R&D in the FY 2017 Budget. The distribution by line offices is provided in the table below.

Line Office	Research	Development	Total R&D (excluding Equipment and Facilities)	Equipment and Facilities	Total R&D with Equipment and Facilities
NOS	\$69,526	\$9,717	\$79,243	\$0	\$79,243
NMFS	\$65,670	\$9,155	\$74,825	\$0	\$74,825
OAR	\$352,405	\$51,351	\$403,756	\$78,787	\$482,543
NWS	\$1,595	\$19,470	\$21,065	\$2,000	\$23,065
NESDIS	\$33,420	\$0	\$33,420	\$0	\$33,420
MS	\$0	\$0	\$0	\$4,557	\$4,557
OMAO	\$0	\$0	\$0	\$117,128	\$117,128
<b>Total</b>	<b>\$522,616</b>	<b>\$89,693</b>	<b>\$612,309</b>	<b>\$202,472</b>	<b>\$814,781</b>

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## NOAA Headquarters Administrative Costs

In FY 2017, NOAA's Line/Staff Office Headquarters will use \$325,873,376 and 1,385.9 FTE to support general management activities, financial and budgeting, and IT-related expenses, as well as to support facilities and other general operating costs. These funds also include support for service contracts, utilities, and rent charges from the GSA. Specifically, NOAA's Line/Staff Office Headquarters will use administrative funds to support the following:

Headquarters Administrative Support Type	Description	NOS Amount	NOS FTE	NMFS Amount	NMFS FTE	OAR Amount	OAR FTE	NWS Amount	NWS FTE	NESDIS Amount	NESDIS FTE	MS Amount	MS FTE	OMAO Amount	OMAO FTE	Total Amount	Total FTE
General Management & Direction/Executive Management	Includes Assistant Administrator's office, public affairs, information services	\$11,171,738	38	\$16,585,279	40.8	\$6,842,000	26.5	\$17,093,187	81	\$8,685,106	35	\$31,955,000	148	\$1,454,000	7.9	<b>\$93,786,310</b>	<b>377.2</b>
Budget & Finance	Includes Budget, Finance and Accounting	\$3,871,935	16	\$6,323,944	23.8	\$2,724,000	18.5	\$6,218,836	22	\$4,432,198	22.9	\$38,156,000	204	\$2,847,000	15.7	<b>\$64,573,913</b>	<b>322.9</b>
Facilities/Other Administrative (CAO Functions)	Includes Facilities and Security costs, as well as other CAO related activities	\$2,371,672	2	\$1,240,107	5	\$1,788,000	5.5	\$7,412,158	22	\$1,374,669	7	\$45,686,000	154	\$944,000	0	<b>\$60,816,606</b>	<b>195.5</b>
Human Resources	All HR services, including Equal Employment Opportunity	\$926,387	5	\$2,390,900	10.5	\$2,771,000	10	\$3,291,085	13	\$1,939,235	9.7	\$19,794,000	131	\$147,000	1	<b>\$31,259,607</b>	<b>180.2</b>
Acquisitions and Grants	Contracts, grants and procurement implementation	\$252,819	2	\$362,924	2	\$1,169,000	8.5	\$0	0	\$341,994	2	\$14,803,000	112	\$138,000	1	<b>\$17,067,737</b>	<b>127.5</b>
Information Technology	Includes IT-related expenses and other CIO related activities	\$6,747,796	13	\$5,373,823	16.5	\$1,240,000	0	\$5,564,927	18	\$11,324,657	26	\$26,606,000	106	\$1,512,000	3.1	<b>\$58,369,203</b>	<b>182.6</b>
<b>Total</b>		<b>\$25,342,347</b>	<b>76.0</b>	<b>\$32,276,977</b>	<b>98.6</b>	<b>\$16,534,000</b>	<b>69.0</b>	<b>\$39,580,193</b>	<b>156.0</b>	<b>\$28,097,859</b>	<b>102.6</b>	<b>\$177,000,000</b>	<b>855.0</b>	<b>\$7,042,000</b>	<b>28.7</b>	<b>\$325,873,376</b>	<b>1,385.9</b>

\*Amounts above to not include NOAA's Direct Bill

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**NATIONAL OCEAN SERVICE**  
(\$ in Thousands)

FY 2017 PROPOSED OPERATING PLAN																
	POS	FTE	FY 2016 Enacted	POS	FTE	FY 2017 Calculated ATBs	FY 2017 Technical ATBs	POS	FTE	FY 2017 Base	POS	FTE	FY 2017 Program Changes	POS	FTE	FY 2017 President's Budget
<b>Navigation, Observations and Positioning</b>																
Navigation, Observations and Positioning	570	542	149,000	0	0	2,192	214	570	542	151,406	0	0	(8,000)	570	542	143,406
Hydrographic Survey Priorities/Contracts	11	10	27,000	0	0	0	0	11	10	27,000	0	0	(2,000)	11	10	25,000
IOOS Regional Observations	0	0	29,500	0	0	0	0	0	0	29,500	0	0	0	0	0	29,500
<b>Total, Navigation, Observations and Positioning</b>	<b>581</b>	<b>552</b>	<b>205,500</b>	<b>0</b>	<b>0</b>	<b>2,192</b>	<b>214</b>	<b>581</b>	<b>552</b>	<b>207,906</b>	<b>0</b>	<b>0</b>	<b>(10,000)</b>	<b>581</b>	<b>552</b>	<b>197,906</b>
<b>Coastal Science and Assessment</b>																
Coastal Science, Assessment, Response and Restoration	310	294	72,600	0	0	1,090	422	310	294	74,112	0	0	0	310	294	74,112
Competitive Research	3	3	9,000	0	0	0	0	3	3	9,000	0	0	4,000	3	3	13,000
<b>Total, Coastal Science and Assessment</b>	<b>313</b>	<b>297</b>	<b>81,600</b>	<b>0</b>	<b>0</b>	<b>1,090</b>	<b>422</b>	<b>313</b>	<b>297</b>	<b>83,112</b>	<b>0</b>	<b>0</b>	<b>4,000</b>	<b>313</b>	<b>297</b>	<b>87,112</b>
<b>Ocean and Coastal Management and Services</b>																
Coastal Zone Management and Services	144	137	40,000	0	0	341	0	144	137	40,341	2	2	13,506	146	139	53,847
Coastal Management Grants	0	0	75,000	0	0	0	0	0	0	75,000	0	0	15,646	0	0	90,646
Coral Reef Program	24	23	26,000	0	0	96	4	24	23	26,100	0	0	0	24	23	26,100
National Estuarine Research Reserve System	0	0	23,000	0	0	0	0	0	0	23,000	0	0	0	0	0	23,000
Sanctuaries and Marine Protected Areas	195	186	49,000	0	0	800	0	195	186	49,800	0	0	0	195	186	49,800
<b>Total, Ocean and Coastal Management and Services</b>	<b>363</b>	<b>346</b>	<b>213,000</b>	<b>0</b>	<b>0</b>	<b>1,237</b>	<b>4</b>	<b>363</b>	<b>346</b>	<b>214,241</b>	<b>2</b>	<b>2</b>	<b>29,152</b>	<b>365</b>	<b>348</b>	<b>243,393</b>
<b>Total, National Ocean Service - ORF</b>	<b>1,257</b>	<b>1,195</b>	<b>500,100</b>	<b>0</b>	<b>0</b>	<b>4,519</b>	<b>640</b>	<b>1,257</b>	<b>1,195</b>	<b>505,259</b>	<b>2</b>	<b>2</b>	<b>23,152</b>	<b>1,259</b>	<b>1,197</b>	<b>528,411</b>
<b>Other National Ocean Service Accounts</b>																
Total, National Ocean Service - PAC	5	5	3,700	0	0	0	0	5	5	3,700	0	0	0	5	5	3,700
Total, National Ocean Service - Other	17	17	98,047	0	0	0	(70,243)	17	17	27,804	1	1	10,000	18	18	37,804
<b>GRAND TOTAL NOS</b>	<b>1,279</b>	<b>1,217</b>	<b>601,847</b>	<b>0</b>	<b>0</b>	<b>4,519</b>	<b>(69,603)</b>	<b>1,279</b>	<b>1,217</b>	<b>536,763</b>	<b>3</b>	<b>3</b>	<b>33,152</b>	<b>1,282</b>	<b>1,220</b>	<b>569,915</b>

**NATIONAL MARINE FISHERIES SERVICE**  
(\$ in Thousands)

FY 2017 PROPOSED OPERATING PLAN																
	POS	FTE	FY 2016 Enacted	POS	FTE	FY 2017 Calculated ATBs	FY 2017 Technical ATBs	POS	FTE	FY 2017 Base	POS	FTE	FY 2017 Program Changes	POS	FTE	FY 2017 President's Budget
<b>Protected Resources Science and Management</b>																
Marine Mammals, Sea Turtles & Other Species	488	464	110,246	0	0	1,409	0	488	464	111,655	35	26	13,452	523	490	125,107
Species Recovery Grants	3	3	6,000	0	0	8	0	3	3	6,008	0	0	16,012	3	3	22,020
Atlantic Salmon	23	22	6,163	0	0	61	0	23	22	6,224	0	0	0	23	22	6,224
Pacific Salmon	339	322	60,000	0	0	1,082	0	339	322	61,082	0	0	2,338	339	322	63,420
<b>Total, Protected Resources Science and Management</b>	<b>853</b>	<b>811</b>	<b>182,409</b>	<b>0</b>	<b>0</b>	<b>2,560</b>	<b>0</b>	<b>853</b>	<b>811</b>	<b>184,969</b>	<b>35</b>	<b>26</b>	<b>31,802</b>	<b>888</b>	<b>837</b>	<b>216,771</b>
<b>Fisheries Science and Management</b>																
Fisheries and Ecosystem Science Programs and Services	625	595	139,489	0	0	1,774	2,098	625	595	143,361	0	0	6,808	625	595	150,169
Fisheries Data Collections, Surveys and Assessments	480	457	163,271	0	0	1,478	0	480	457	164,749	0	0	0	480	457	164,749
Observers and Training	158	150	43,655	0	0	403	0	158	150	44,058	0	0	1,095	158	150	45,153
Fisheries Management Programs and Services	466	444	115,995	0	0	1,460	379	466	444	117,834	0	0	4,061	466	444	121,895
Aquaculture	21	20	6,300	0	0	81	0	21	20	6,381	0	0	1,525	21	20	7,906
Salmon Management Activities	28	27	31,500	0	0	85	0	28	27	31,585	0	0	0	28	27	31,585
Regional Councils and Fisheries Commissions	13	12	33,470	0	0	784	0	13	12	34,254	0	0	0	13	12	34,254
Interjurisdictional Fisheries Grants	1	1	3,000	0	0	4	0	1	1	3,004	0	0	0	1	1	3,004
<b>Total, Fisheries Science and Management</b>	<b>1,792</b>	<b>1,706</b>	<b>536,680</b>	<b>0</b>	<b>0</b>	<b>6,069</b>	<b>2,477</b>	<b>1,792</b>	<b>1,706</b>	<b>545,226</b>	<b>0</b>	<b>0</b>	<b>13,489</b>	<b>1,792</b>	<b>1,706</b>	<b>558,715</b>
<b>Enforcement</b>																
Enforcement	248	232	69,000	0	5	767	73	248	237	69,840	0	0	1,018	248	237	70,858
<b>Total, Enforcement</b>	<b>248</b>	<b>232</b>	<b>69,000</b>	<b>0</b>	<b>5</b>	<b>767</b>	<b>73</b>	<b>248</b>	<b>237</b>	<b>69,840</b>	<b>0</b>	<b>0</b>	<b>1,018</b>	<b>248</b>	<b>237</b>	<b>70,858</b>
<b>Habitat Conservation and Restoration</b>																
Habitat Conservation and Restoration	160	154	61,408	0	0	463	42	160	154	61,913	16	12	(3,523)	176	166	58,390
<b>Subtotal, Habitat Conservation &amp; Restoration</b>	<b>160</b>	<b>154</b>	<b>61,408</b>	<b>0</b>	<b>0</b>	<b>463</b>	<b>42</b>	<b>160</b>	<b>154</b>	<b>61,913</b>	<b>16</b>	<b>12</b>	<b>(3,523)</b>	<b>176</b>	<b>166</b>	<b>58,390</b>
<b>Total, National Marine Fisheries Service - ORF</b>	<b>3,053</b>	<b>2,903</b>	<b>849,497</b>	<b>0</b>	<b>5</b>	<b>9,859</b>	<b>2,592</b>	<b>3,053</b>	<b>2,908</b>	<b>861,948</b>	<b>51</b>	<b>38</b>	<b>42,786</b>	<b>3,104</b>	<b>2,946</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	0	0	0	0	0	0	0	0	0	0
Total, National Marine Fisheries Service - Other	40	40	122,206	0	0	0	(20,010)	40	40	102,196	0	0	9,000	40	40	111,196
<b>GRAND TOTAL NMFS</b>	<b>3,093</b>	<b>2,943</b>	<b>971,703</b>	<b>0</b>	<b>5</b>	<b>9,859</b>	<b>(17,418)</b>	<b>3,093</b>	<b>2,948</b>	<b>964,144</b>	<b>51</b>	<b>38</b>	<b>51,786</b>	<b>3,144</b>	<b>2,986</b>	<b>1,015,930</b>

OFFICE of OCEANIC AND ATMOSPHERIC RESEARCH  
(\$ in Thousands)

FY 2017 PROPOSED OPERATING PLAN																
	POS	FTE	FY 2016 Enacted	POS	FTE	FY 2017 Calculated ATBs	FY 2017 Technical ATBs	POS	FTE	FY 2017 Base	POS	FTE	FY 2017 Program Changes	POS	FTE	FY 2017 President's Budget
<b>Climate Research</b>																
Laboratories & Cooperative Institutes																
Laboratories & Cooperative Institutes	202	190	60,000	0	0	420	0	202	190	60,420	2	2	10,493	204	192	70,913
<b>Subtotal, Laboratories &amp; Cooperative Institutions</b>	<b>202</b>	<b>190</b>	<b>60,000</b>	<b>0</b>	<b>0</b>	<b>420</b>	<b>0</b>	<b>202</b>	<b>190</b>	<b>60,420</b>	<b>2</b>	<b>2</b>	<b>10,493</b>	<b>204</b>	<b>192</b>	<b>70,913</b>
<b>Regional Climate Data &amp; Information</b>																
Regional Climate Data & Information	21	19	38,000	0	0	266	0	21	19	38,266	4	3	14,437	25	22	52,703
<b>Subtotal, Regional Climate Data &amp; Information</b>	<b>21</b>	<b>19</b>	<b>38,000</b>	<b>0</b>	<b>0</b>	<b>266</b>	<b>0</b>	<b>21</b>	<b>19</b>	<b>38,266</b>	<b>4</b>	<b>3</b>	<b>14,437</b>	<b>25</b>	<b>22</b>	<b>52,703</b>
<b>Climate Competitive Research</b>																
Climate Competitive Research	66	63	60,000	0	0	420	0	66	63	60,420	1	1	5,830	67	64	66,250
<b>Subtotal, Climate Competitive Research</b>	<b>66</b>	<b>63</b>	<b>60,000</b>	<b>0</b>	<b>0</b>	<b>420</b>	<b>0</b>	<b>66</b>	<b>63</b>	<b>60,420</b>	<b>1</b>	<b>1</b>	<b>5,830</b>	<b>67</b>	<b>64</b>	<b>66,250</b>
<b>Total, Climate Research</b>	<b>289</b>	<b>272</b>	<b>158,000</b>	<b>0</b>	<b>0</b>	<b>1,106</b>	<b>0</b>	<b>289</b>	<b>272</b>	<b>159,106</b>	<b>7</b>	<b>6</b>	<b>30,760</b>	<b>296</b>	<b>278</b>	<b>189,866</b>
<b>Weather &amp; Air Chemistry Research</b>																
Laboratories & Cooperative Institutes																
Laboratories & Cooperative Institutes	228	218	76,000	0	0	532	4,017	228	218	80,549	0	0	(7,896)	228	218	72,653
<b>Subtotal, Laboratories &amp; Cooperative Institutes</b>	<b>228</b>	<b>218</b>	<b>76,000</b>	<b>0</b>	<b>0</b>	<b>532</b>	<b>4,017</b>	<b>228</b>	<b>218</b>	<b>80,549</b>	<b>0</b>	<b>0</b>	<b>(7,896)</b>	<b>228</b>	<b>218</b>	<b>72,653</b>
<b>Weather &amp; Air Chemistry Research Programs</b>																
U.S. Weather Research Program (USWRP)	5	5	8,000	0	0	56	0	5	5	8,056	1	1	8,078	6	6	16,134
Tornado Severe Storm Research / Phased Array Radar	0	0	13,158	0	0	0	0	0	0	13,158	0	0	0	0	0	13,158
Joint Technology Transfer Initiative	0	0	6,000	0	0	0	0	0	0	6,000	0	0	(6,000)	0	0	0
<b>Subtotal, Weather &amp; Air Chemistry Research Programs</b>	<b>5</b>	<b>5</b>	<b>27,158</b>	<b>0</b>	<b>0</b>	<b>56</b>	<b>0</b>	<b>5</b>	<b>5</b>	<b>27,214</b>	<b>1</b>	<b>1</b>	<b>2,078</b>	<b>6</b>	<b>6</b>	<b>29,292</b>
<b>Total, Weather &amp; Air Chemistry Research</b>	<b>233</b>	<b>223</b>	<b>103,158</b>	<b>0</b>	<b>0</b>	<b>588</b>	<b>4,017</b>	<b>233</b>	<b>223</b>	<b>107,763</b>	<b>1</b>	<b>1</b>	<b>(5,818)</b>	<b>234</b>	<b>224</b>	<b>101,945</b>
<b>Ocean, Coastal, and Great Lakes Research</b>																
Laboratories & Cooperative Institutes																
Laboratories & Cooperative Institutes	138	132	32,000	0	0	374	0	138	132	32,374	0	0	(4,985)	138	132	27,389
<b>Subtotal, Laboratories &amp; Cooperative Institutes</b>	<b>138</b>	<b>132</b>	<b>32,000</b>	<b>0</b>	<b>0</b>	<b>374</b>	<b>0</b>	<b>138</b>	<b>132</b>	<b>32,374</b>	<b>0</b>	<b>0</b>	<b>(4,985)</b>	<b>138</b>	<b>132</b>	<b>27,389</b>

OFFICE of OCEANIC AND ATMOSPHERIC RESEARCH  
(\$ in Thousands)

FY 2017 PROPOSED OPERATING PLAN					FY 2017				FY 2017				FY 2017		FY 2017	
	POS	FTE	FY 2016 Enacted	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	Base	POS	FTE	Program Changes	POS	FTE	President's Budget
<b>National Sea Grant College Program</b>																
National Sea Grant College Program Base	14	13	64,000	0	0	448	0	14	13	64,448	0	0	(2,548)	14	13	61,900
Marine Aquaculture Program	1	1	9,000	0	0	0	0	1	1	9,000	0	0	(2,000)	1	1	7,000
<b>Subtotal, National Sea Grant College Program</b>	<b>15</b>	<b>14</b>	<b>73,000</b>	<b>0</b>	<b>0</b>	<b>448</b>	<b>0</b>	<b>15</b>	<b>14</b>	<b>73,448</b>	<b>0</b>	<b>0</b>	<b>(4,548)</b>	<b>15</b>	<b>14</b>	<b>68,900</b>
<b>Ocean Exploration and Research</b>																
Ocean Exploration and Research	20	19	32,000	0	0	224	0	20	19	32,224	0	0	(12,656)	20	19	19,568
<b>Subtotal, Ocean Exploration and Research</b>	<b>20</b>	<b>19</b>	<b>32,000</b>	<b>0</b>	<b>0</b>	<b>224</b>	<b>0</b>	<b>20</b>	<b>19</b>	<b>32,224</b>	<b>0</b>	<b>0</b>	<b>(12,656)</b>	<b>20</b>	<b>19</b>	<b>19,568</b>
<b>Other Ecosystems Programs</b>																
Integrated Ocean Acidification	20	16	10,000	0	2	70	0	20	18	10,070	0	0	11,705	20	18	21,775
<b>Subtotal, Other Ecosystems Programs</b>	<b>20</b>	<b>16</b>	<b>10,000</b>	<b>0</b>	<b>2</b>	<b>70</b>	<b>0</b>	<b>20</b>	<b>18</b>	<b>10,070</b>	<b>0</b>	<b>0</b>	<b>11,705</b>	<b>20</b>	<b>18</b>	<b>21,775</b>
<b>Sustained Ocean Observations and Monitoring</b>																
Sustained Ocean Observations and Monitoring	49	47	41,596	0	0	227	0	49	47	41,823	0	0	0	49	47	41,823
<b>Subtotal, Sustained Ocean Observations and Monitoring</b>	<b>49</b>	<b>47</b>	<b>41,596</b>	<b>0</b>	<b>0</b>	<b>227</b>	<b>0</b>	<b>49</b>	<b>47</b>	<b>41,823</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>49</b>	<b>47</b>	<b>41,823</b>
			0													
<b>Total, Ocean, Coastal, &amp; Great Lakes Research</b>	<b>242</b>	<b>228</b>	<b>188,596</b>	<b>0</b>	<b>2</b>	<b>1,343</b>	<b>0</b>	<b>242</b>	<b>230</b>	<b>189,939</b>	<b>0</b>	<b>0</b>	<b>(10,484)</b>	<b>242</b>	<b>230</b>	<b>179,455</b>
<b>Innovative Research &amp; Technology</b>																
High Performance Computing Initiatives	11	10	12,144	0	0	0	0	11	10	12,144	0	0	0	11	10	12,144
Research Transition Acceleration Program	0	0	0	0	0	0	0	0	0	0	2	2	10,000	2	2	10,000
<b>Total, Innovative Research &amp; Technology</b>	<b>11</b>	<b>10</b>	<b>12,144</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>10</b>	<b>12,144</b>	<b>2</b>	<b>2</b>	<b>10,000</b>	<b>13</b>	<b>12</b>	<b>22,144</b>
<b>Total, Office of Oceanic and Atmospheric Research - ORF</b>	<b>775</b>	<b>733</b>	<b>461,898</b>	<b>0</b>	<b>2</b>	<b>3,037</b>	<b>4,017</b>	<b>775</b>	<b>735</b>	<b>468,952</b>	<b>10</b>	<b>9</b>	<b>24,458</b>	<b>785</b>	<b>744</b>	<b>493,410</b>
<b>Other Office of Oceanic and Atmospheric Research Accounts</b>																
Total, Office of Ocean and Atmospheric Research - PAC	0	0	20,079	0	0	0	0	0	0	20,079	0	0	6,300	0	0	26,379
Total, Office of Oceanic and Atmospheric Research - Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>GRAND TOTAL OAR</b>	<b>775</b>	<b>733</b>	<b>481,977</b>	<b>0</b>	<b>2</b>	<b>3,037</b>	<b>4,017</b>	<b>775</b>	<b>735</b>	<b>489,031</b>	<b>10</b>	<b>9</b>	<b>30,758</b>	<b>785</b>	<b>744</b>	<b>519,789</b>

**NATIONAL WEATHER SERVICE**  
(\$ in Thousands)

FY 2017 PROPOSED OPERATING PLAN																
	POS	FTE	FY 2016 Enacted	POS	FTE	FY 2017 Calculated ATBs	FY 2017 Technical ATBs	POS	FTE	FY 2017 Base	POS	FTE	FY 2017 Program Changes	POS	FTE	FY 2017 President's Budget
Observations	844	804	216,363	129	129	3,070	15,050	973	933	234,483	0	0	(11,487)	973	933	222,996
Central Processing	244	232	92,871	0	0	486	0	244	232	93,357	(98)	(98)	(4,969)	146	134	88,388
Analyze, Forecast and Support	3,163	3,010	496,031	(111)	(111)	7,773	(13,187)	3,052	2,899	490,617	12	9	(4,686)	3,064	2,908	485,931
Dissemination	86	82	44,743	0	0	450	43	86	82	45,236	0	0	2,000	86	82	47,236
Science and Technology Integration	514	488	138,826	(18)	(18)	1,259	(1,250)	496	470	138,835	0	0	(6,879)	496	470	131,956
<b>Total, National Weather Service - ORF</b>	<b>4,851</b>	<b>4,616</b>	<b>988,834</b>	<b>0</b>	<b>0</b>	<b>13,038</b>	<b>656</b>	<b>4,851</b>	<b>4,616</b>	<b>1,002,528</b>	<b>(86)</b>	<b>(89)</b>	<b>(26,021)</b>	<b>4,765</b>	<b>4,527</b>	<b>976,507</b>
<b>Other National Weather Service Accounts</b>																
Total, National Weather Service - PAC	23	22	135,315	0	0	0	0	23	22	135,315	0	0	7,470	23	22	142,785
Total, National Weather Service - Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>GRAND TOTAL NWS</b>	<b>4,874</b>	<b>4,638</b>	<b>1,124,149</b>	<b>0</b>	<b>0</b>	<b>13,038</b>	<b>656</b>	<b>4,874</b>	<b>4,638</b>	<b>1,137,843</b>	<b>(86)</b>	<b>(89)</b>	<b>(18,551)</b>	<b>4,788</b>	<b>4,549</b>	<b>1,119,292</b>

NATIONAL ENVIRONMENTAL SATELLITE, DATA AND INFORMATION SERVICE  
(\$ in Thousands)

FY 2017 PROPOSED OPERATING PLAN																
	POS	FTE	FY 2016 Enacted	POS	FTE	FY 2017 Calculated ATBs	FY 2017 Technical ATBs	POS	FTE	FY 2017 Base	POS	FTE	FY 2017 Program Changes	POS	FTE	FY 2017 President's Budget
<b>Environmental Satellite Observing Systems</b>																
<b>Office of Satellite and Product Operations (OSPO)</b>																
Satellite and Product Operations	237	237	93,000	0	0	773	25,223	237	237	118,996	0	0	4,428	237	237	123,424
NSOF Operations	0	0	9,000	0	0	450	4,800	0	0	14,250	0	0	0	0	0	14,250
<b>Subtotal, Office of Satellite and Product Operations (OSPO)</b>	<b>237</b>	<b>237</b>	<b>102,000</b>	<b>0</b>	<b>0</b>	<b>1,223</b>	<b>30,023</b>	<b>237</b>	<b>237</b>	<b>133,246</b>	<b>0</b>	<b>0</b>	<b>4,428</b>	<b>237</b>	<b>237</b>	<b>137,674</b>
<b>Product Development, Readiness &amp; Application</b>																
Product Development, Readiness & Application	88	88	26,000	0	0	850	7,104	88	88	33,954	0	0	316	88	88	34,270
<b>Subtotal, Product Development, Readiness &amp; Application</b>	<b>88</b>	<b>88</b>	<b>26,000</b>	<b>0</b>	<b>0</b>	<b>850</b>	<b>7,104</b>	<b>88</b>	<b>88</b>	<b>33,954</b>	<b>0</b>	<b>0</b>	<b>316</b>	<b>88</b>	<b>88</b>	<b>34,270</b>
Commercial Remote Sensing Regulatory Affairs	6	6	1,000	0	0	0	0	6	6	1,000	1	1	1,065	7	7	2,065
Office of Space Commerce	4	4	600	0	0	0	0	4	4	600	1	1	1,400	5	5	2,000
Group on Earth Observations (GEO)	0	0	500	0	0	0	0	0	0	500	0	0	0	0	0	500
<b>Total, Environmental Satellite Observing Systems</b>	<b>335</b>	<b>335</b>	<b>130,100</b>	<b>0</b>	<b>0</b>	<b>2,073</b>	<b>37,127</b>	<b>335</b>	<b>335</b>	<b>169,300</b>	<b>2</b>	<b>2</b>	<b>7,209</b>	<b>337</b>	<b>337</b>	<b>176,509</b>
<b>National Centers for Environmental Information</b>																
National Centers for Environmental Information	242	242	58,986	0	0	900	2,331	242	242	62,217	0	0	1,261	242	242	63,478
<b>Total, National Centers for Environmental Information</b>	<b>242</b>	<b>242</b>	<b>58,986</b>	<b>0</b>	<b>0</b>	<b>900</b>	<b>2,331</b>	<b>242</b>	<b>242</b>	<b>62,217</b>	<b>0</b>	<b>0</b>	<b>1,261</b>	<b>242</b>	<b>242</b>	<b>63,478</b>
<b>Total, NESDIS - ORF</b>	<b>577</b>	<b>577</b>	<b>189,086</b>	<b>0</b>	<b>0</b>	<b>2,973</b>	<b>39,458</b>	<b>577</b>	<b>577</b>	<b>231,517</b>	<b>2</b>	<b>2</b>	<b>8,470</b>	<b>579</b>	<b>579</b>	<b>239,987</b>
<b>Other NESDIS Accounts</b>																
Total, NESDIS - PAC	312	310	2,160,270	0	0	0	(38,939)	312	310	2,121,331	0	0	(57,631)	312	310	2,063,700
Total, NESDIS - Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>GRAND TOTAL NESDIS</b>	<b>889</b>	<b>887</b>	<b>2,349,356</b>	<b>0</b>	<b>0</b>	<b>2,973</b>	<b>519</b>	<b>889</b>	<b>887</b>	<b>2,352,848</b>	<b>2</b>	<b>2</b>	<b>(49,161)</b>	<b>891</b>	<b>889</b>	<b>2,303,687</b>



**MISSION SUPPORT**  
(\$ in Thousands)

FY 2017 PROPOSED OPERATING PLAN																
	POS	FTE	FY 2016 Enacted	POS	FTE	FY 2017 Calculated ATBs	FY 2017 Technical ATBs	POS	FTE	FY 2017 Base	POS	FTE	FY 2017 Program Changes	POS	FTE	FY 2017 President's Budget
Executive Leadership	147	140	27,000	0	0	188	78	147	140	27,266	0	0	0	147	140	27,266
Mission Services and Management	763	724	148,000	(11)	(11)	8,195	(8,838)	752	713	147,357	45	34	7,842	797	747	155,199
IT Security	0	0	8,300	11	11	50	1,700	11	11	10,050	0	0	0	11	11	10,050
Payment to the DOC Working Capital Fund	0	0	43,000	0	0	1,649	25,568	0	0	70,217	0	0	2,295	0	0	72,512
Office of Education	25	23	26,631	0	0	50	0	25	23	26,681	0	0	(10,200)	25	23	16,481
<b>Total, Mission Support - ORF</b>	<b>935</b>	<b>887</b>	<b>252,931</b>	<b>0</b>	<b>0</b>	<b>10,132</b>	<b>18,508</b>	<b>935</b>	<b>887</b>	<b>281,571</b>	<b>45</b>	<b>34</b>	<b>(63)</b>	<b>980</b>	<b>921</b>	<b>281,508</b>
<b>Other Mission Support Accounts</b>																
Total, Mission Support - PAC	0	0	1,000	0	0	0	0	0	0	1,000	2	2	3,557	2	2	4,557
Total, Mission Support - Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>GRAND TOTAL MS</b>	<b>935</b>	<b>887</b>	<b>253,931</b>	<b>0</b>	<b>0</b>	<b>10,132</b>	<b>18,508</b>	<b>935</b>	<b>887</b>	<b>282,571</b>	<b>47</b>	<b>36</b>	<b>3,494</b>	<b>982</b>	<b>923</b>	<b>286,065</b>

OFFICE OF MARINE AND AVIATION OPERATIONS  
(\$ in Thousands)

FY 2017 PROPOSED OPERATING PLAN																
	POS	FTE	FY 2016 Enacted	POS	FTE	FY 2017 Calculated ATBs	FY 2017 Technical ATBs	POS	FTE	FY 2017 Base	POS	FTE	FY 2017 Program Changes	POS	FTE	FY 2017 President's Budget
<b>Marine Operations &amp; Maintenance</b>																
Marine Operations & Maintenance	869	828	178,838	0	0	3,424	114	869	828	182,376	0	0	2,000	869	828	184,376
<b>Total, Marine Operations &amp; Maintenance</b>	<b>869</b>	<b>828</b>	<b>178,838</b>	<b>0</b>	<b>0</b>	<b>3,424</b>	<b>114</b>	<b>869</b>	<b>828</b>	<b>182,376</b>	<b>0</b>	<b>0</b>	<b>2,000</b>	<b>869</b>	<b>828</b>	<b>184,376</b>
<b>Aviation Operations</b>																
Aircraft Services	127	121	32,293	0	0	618	0	127	121	32,911	0	0	0	127	121	32,911
<b>Total, Aviation Operations</b>	<b>127</b>	<b>121</b>	<b>32,293</b>	<b>0</b>	<b>0</b>	<b>618</b>	<b>0</b>	<b>127</b>	<b>121</b>	<b>32,911</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>127</b>	<b>121</b>	<b>32,911</b>
<b>Total, OMAO - ORF</b>	<b>996</b>	<b>949</b>	<b>211,131</b>	<b>0</b>	<b>0</b>	<b>4,042</b>	<b>114</b>	<b>996</b>	<b>949</b>	<b>215,287</b>	<b>0</b>	<b>0</b>	<b>2,000</b>	<b>996</b>	<b>949</b>	<b>217,287</b>
<b>Other OMAO Accounts</b>																
Total, OMAO - PAC	6	5	91,750	0	1	0	0	6	6	91,750	0	0	(51,050)	6	6	40,700
Total, OMAO - Other	0	0	31,311	0	0	0	0	0	0	31,311	0	0	0	0	0	31,311
<b>GRAND TOTAL OMAO</b>	<b>1,002</b>	<b>954</b>	<b>334,192</b>	<b>0</b>	<b>1</b>	<b>4,042</b>	<b>114</b>	<b>1,002</b>	<b>955</b>	<b>338,348</b>	<b>0</b>	<b>0</b>	<b>(49,050)</b>	<b>1,002</b>	<b>955</b>	<b>289,298</b>

**ORF SUMMARY (DISCRETIONARY)  
LINE OFFICE DIRECT OBLIGATIONS  
(\$ in Thousands)**

FY 2017 PROPOSED OPERATING PLAN																
	POS	FTE	FY 2016 Enacted	POS	FTE	FY 2017 Calculated ATBs	FY 2017 Technical ATBs	POS	FTE	FY 2017 Base	POS	FTE	FY 2017 Program Changes	POS	FTE	FY 2017 President's Budget
National Ocean Service	1,257	1,195	500,100	0	0	4,519	640	1,257	1,195	505,259	2	2	23,152	1,259	1,197	528,411
National Marine Fisheries Service	3,053	2,903	849,497	0	5	9,859	2,592	3,053	2,908	861,948	51	38	42,786	3,104	2,946	904,734
Office of Oceanic and Atmospheric Research	775	733	461,898	0	2	3,037	4,017	775	735	468,952	10	9	24,458	785	744	493,410
National Weather Service	4,851	4,616	988,834	0	0	13,038	656	4,851	4,616	1,002,528	(86)	(89)	(26,021)	4,765	4,527	976,507
National Environmental Satellite, Data and Information Service	577	577	189,086	0	0	2,973	39,458	577	577	231,517	2	2	8,470	579	579	239,987
Mission Support	935	887	252,931	0	0	10,132	18,508	935	887	281,571	45	34	(63)	980	921	281,508
Office of Marine and Aviation Operations	996	949	211,131	0	0	4,042	114	996	949	215,287	0	0	2,000	996	949	217,287
<b>SUBTOTAL LO DIRECT DISCRETIONARY ORF OBLIGATIONS</b>	<b>12,444</b>	<b>11,860</b>	<b>3,453,477</b>	<b>0</b>	<b>7</b>	<b>47,600</b>	<b>65,985</b>	<b>12,444</b>	<b>11,867</b>	<b>3,567,062</b>	<b>24</b>	<b>(4)</b>	<b>74,782</b>	<b>12,468</b>	<b>11,863</b>	<b>3,641,844</b>

ORF ADJUSTMENTS (DISCRETIONARY)  
(\$ in Thousands)

FY 2017 PROPOSED OPERATING PLAN																
	POS	FTE	FY 2016 Enacted	POS	FTE	FY 2017 Calculated ATBs	FY 2017 Technical ATBs	POS	FTE	FY 2017 Base	POS	FTE	FY 2017 Program Changes	POS	FTE	FY 2017 President's Budget
<b>SUBTOTAL LO DIRECT OBLIGATIONS</b>	<b>12,444</b>	<b>11,860</b>	<b>3,453,477</b>	<b>0</b>	<b>7</b>	<b>47,600</b>	<b>65,985</b>	<b>12,444</b>	<b>11,867</b>	<b>3,567,062</b>	<b>24</b>	<b>(4)</b>	<b>74,782</b>	<b>12,468</b>	<b>11,863</b>	<b>3,641,844</b>
<b>FINANCING</b>																
De-Obligations	0	0	(17,500)	0	0	0	0	0	0	(17,500)	0	0	0	0	0	(17,500)
<b>Total ORF Financing</b>	<b>0</b>	<b>0</b>	<b>(17,500)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>(17,500)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>(17,500)</b>
<b>SUBTOTAL BUDGET AUTHORITY</b>	<b>12,444</b>	<b>11,860</b>	<b>3,435,977</b>	<b>0</b>	<b>7</b>	<b>47,600</b>	<b>65,985</b>	<b>12,444</b>	<b>11,867</b>	<b>3,549,562</b>	<b>24</b>	<b>(4)</b>	<b>74,782</b>	<b>12,468</b>	<b>11,863</b>	<b>3,624,344</b>
<b>TRANSFERS</b>																
Transfer from P&D to ORF	0	0	(130,164)	0	0	0	0	0	0	(130,164)	0	0	0	0	0	(130,164)
<b>Total ORF Transfers</b>	<b>0</b>	<b>0</b>	<b>(130,164)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>(130,164)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>(130,164)</b>
<b>SUBTOTAL APPROPRIATION</b>	<b>12,444</b>	<b>11,860</b>	<b>3,305,813</b>	<b>0</b>	<b>7</b>	<b>47,600</b>	<b>65,985</b>	<b>12,444</b>	<b>11,867</b>	<b>3,419,398</b>	<b>24</b>	<b>(4)</b>	<b>74,782</b>	<b>12,468</b>	<b>11,863</b>	<b>3,494,180</b>

PROCUREMENT, ACQUISITION, AND CONSTRUCTION (DISCRETIONARY)  
(\$ in Thousands)

FY 2017 PROPOSED OPERATING PLAN	POS	FTE	FY 2016 Enacted	POS	FTE	FY 2017 Calculated ATBs	FY 2017 Technical ATBs	POS	FTE	FY 2017 Base	POS	FTE	FY 2017 Program Changes	POS	FTE	FY 2017 President's Budget
<b>NOS</b>																
<b>NERRS Construction</b>																
National Estuarine Research Reserve Construction (NERRS)	2	2	1,700	0	0	0	0	2	2	1,700	0	0	0	2	2	1,700
<b>Subtotal, NERRS Construction</b>	<b>2</b>	<b>2</b>	<b>1,700</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>1,700</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>1,700</b>
<b>Marine Sanctuaries Construction</b>																
Marine Sanctuaries Base	3	3	2,000	0	0	0	0	3	3	2,000	0	0	0	3	3	2,000
<b>Subtotal, Marine Sanctuary Construction</b>	<b>3</b>	<b>3</b>	<b>2,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>2,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>2,000</b>
<b>Subtotal, NOS Construction</b>	<b>5</b>	<b>5</b>	<b>3,700</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>5</b>	<b>3,700</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>5</b>	<b>3,700</b>
<b>Total, NOS - PAC</b>	<b>5</b>	<b>5</b>	<b>3,700</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>5</b>	<b>3,700</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>5</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>0</b>	<b>0</b>	<b>0</b>	<b>0</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	0	0	20,079	0	0	0	0	0	0	20,079	0	0	6,300	0	0	26,379
<b>Subtotal, OAR Systems Acquisition</b>	<b>0</b>	<b>0</b>	<b>20,079</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>20,079</b>	<b>0</b>	<b>0</b>	<b>6,300</b>	<b>0</b>	<b>0</b>	<b>26,379</b>
<b>Total, OAR - PAC</b>	<b>0</b>	<b>0</b>	<b>20,079</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>20,079</b>	<b>0</b>	<b>0</b>	<b>6,300</b>	<b>0</b>	<b>0</b>	<b>26,379</b>
<b>NWS</b>																
<b>Systems Acquisition</b>																
Observations	0	0	16,720	0	0	0	0	0	0	16,720	0	0	16,035	0	0	32,755
Central Processing	23	22	64,261	0	0	0	0	23	22	64,261	0	0	2,500	23	22	66,761
Dissemination	0	0	45,684	0	0	0	0	0	0	45,684	0	0	(11,065)	0	0	34,619
<b>Subtotal, NWS Systems Acquisition</b>	<b>23</b>	<b>22</b>	<b>126,665</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>23</b>	<b>22</b>	<b>126,665</b>	<b>0</b>	<b>0</b>	<b>7,470</b>	<b>23</b>	<b>22</b>	<b>134,135</b>
<b>Construction</b>																
Facilities Construction and Major Repairs	0	0	8,650	0	0	0	0	0	0	8,650	0	0	0	0	0	8,650
<b>Subtotal, NWS Construction</b>	<b>0</b>	<b>0</b>	<b>8,650</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>8,650</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>8,650</b>
<b>Total, NWS - PAC</b>	<b>23</b>	<b>22</b>	<b>135,315</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>23</b>	<b>22</b>	<b>135,315</b>	<b>0</b>	<b>0</b>	<b>7,470</b>	<b>23</b>	<b>22</b>	<b>142,785</b>

**PROCUREMENT, ACQUISITION, AND CONSTRUCTION (DISCRETIONARY)**  
(\$ in Thousands)

FY 2017 PROPOSED OPERATING PLAN																
	POS	FTE	FY 2016 Enacted	POS	FTE	FY 2017 Calculated ATBs	FY 2017 Technical ATBs	POS	FTE	FY 2017 Base	POS	FTE	FY 2017 Program Changes	POS	FTE	FY 2017 President's Budget
<b>NESDIS</b>																
<b>Systems Acquisition</b>																
Geostationary Systems - R	63	63	871,791	0	0	0	(33,900)	63	63	837,891	0	0	(85,107)	63	63	752,784
Jason-3	3	3	7,458	0	0	0	(2,931)	3	3	4,527	0	0	(170)	3	3	4,357
Joint Polar Satellite System (JPSS)	97	97	808,966	0	0	0	0	97	97	808,966	0	0	(21,720)	97	97	787,246
Polar Follow On	8	6	370,000	0	0	0	0	8	6	370,000	0	0	23,000	8	6	393,000
Cooperative Data and Rescue Services (CDARS)	0	0	500	0	0	0	0	0	0	500	0	0	0	0	0	500
DSCOVR	4	4	3,200	0	0	0	(908)	4	4	2,292	0	0	1,453	4	4	3,745
Space Weather Follow On	0	0	1,200	0	0	0	0	0	0	1,200	0	0	1,300	0	0	2,500
COSMIC 2/GNSS RO	1	1	10,100	0	0	0	0	1	1	10,100	0	0	6,100	1	1	16,200
Satellite Ground Services	84	84	54,000	0	0	0	(1,200)	84	84	52,800	0	0	6,225	84	84	59,025
System Architecture and Advanced Planning	14	14	3,929	0	0	0	0	14	14	3,929	0	0	1,000	14	14	4,929
Projects, Planning and Analysis	36	36	25,200	0	0	0	0	36	36	25,200	0	0	8,288	36	36	33,488
Commercial Weather Data Pilot	2	2	3,000	0	0	0	0	2	2	3,000	0	0	2,000	2	2	5,000
<b>Subtotal, NESDIS Systems Acquisition</b>	<b>312</b>	<b>310</b>	<b>2,159,344</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>(38,939)</b>	<b>312</b>	<b>310</b>	<b>2,120,405</b>	<b>0</b>	<b>0</b>	<b>(57,631)</b>	<b>312</b>	<b>310</b>	<b>2,062,774</b>
<b>Construction</b>																
Satellite CDA Facility	0	0	2,228	0	0	0	0	0	0	2,228	0	0	0	0	0	2,228
<b>Subtotal, NESDIS Construction</b>	<b>0</b>	<b>0</b>	<b>2,228</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2,228</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2,228</b>
<b>Transfer to OIG</b>	<b>0</b>	<b>0</b>	<b>(1,302)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>(1,302)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>(1,302)</b>
<b>Total, NESDIS - PAC</b>	<b>312</b>	<b>310</b>	<b>2,160,270</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>(38,939)</b>	<b>312</b>	<b>310</b>	<b>2,121,331</b>	<b>0</b>	<b>0</b>	<b>(57,631)</b>	<b>312</b>	<b>310</b>	<b>2,063,700</b>
<b>Mission Support</b>																
<b>Construction</b>																
NOAA Construction	0	0	1,000	0	0	0	0	0	0	1,000	2	2	3,557	2	2	4,557
<b>Subtotal, Construction</b>	<b>0</b>	<b>0</b>	<b>1,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,000</b>	<b>2</b>	<b>2</b>	<b>3,557</b>	<b>2</b>	<b>2</b>	<b>4,557</b>
<b>Total, Mission Support - PAC</b>	<b>0</b>	<b>0</b>	<b>1,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,000</b>	<b>2</b>	<b>2</b>	<b>3,557</b>	<b>2</b>	<b>2</b>	<b>4,557</b>
<b>OMAO</b>																
<b>OMAO - Fleet Replacement</b>																
Fleet Capital Improvements & Tech Infusion (Vessel Equip & Tech Refresh)	1	1	11,700	0	0	0	0	1	1	11,700	0	0	5,000	1	1	16,700
New Vessel Construction	5	4	80,050	0	1	0	0	5	5	80,050	0	0	(56,050)	5	5	24,000
<b>Subtotal, OMAO Fleet Replacement</b>	<b>6</b>	<b>5</b>	<b>91,750</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>6</b>	<b>91,750</b>	<b>0</b>	<b>0</b>	<b>(51,050)</b>	<b>6</b>	<b>6</b>	<b>40,700</b>
<b>Total, OMAO - PAC</b>	<b>6</b>	<b>5</b>	<b>91,750</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>6</b>	<b>91,750</b>	<b>0</b>	<b>0</b>	<b>(51,050)</b>	<b>6</b>	<b>6</b>	<b>40,700</b>
<b>GRAND TOTAL PAC</b>	<b>346</b>	<b>342</b>	<b>2,412,114</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>(38,939)</b>	<b>346</b>	<b>343</b>	<b>2,373,175</b>	<b>2</b>	<b>2</b>	<b>(91,354)</b>	<b>348</b>	<b>345</b>	<b>2,281,821</b>

PAC ADJUSTMENTS (DISCRETIONARY)  
(\$ in Thousands)

FY 2017 PROPOSED OPERATING PLAN																
	POS	FTE	FY 2016 Enacted	POS	FTE	FY 2017 Calculated ATBs	FY 2017 Technical ATBs	POS	FTE	FY 2017 Base	POS	FTE	FY 2017 Program Changes	POS	FTE	FY 2017 President's Budget
<b>SUBTOTAL DIRECT OBLIGATIONS</b>	<b>346</b>	<b>342</b>	<b>2,412,114</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>(38,939)</b>	<b>346</b>	<b>343</b>	<b>2,373,175</b>	<b>2</b>	<b>2</b>	<b>(91,354)</b>	<b>348</b>	<b>345</b>	<b>2,281,821</b>
<b>FINANCING</b>																
Deobligations	0	0	(13,000)	0	0	0	0	0	0	(13,000)	0	0	0	0	0	(13,000)
<b>Total PAC Financing</b>	<b>0</b>	<b>0</b>	<b>(13,000)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>(13,000)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>(13,000)</b>
<b>SUBTOTAL BUDGET AUTHORITY</b>	<b>346</b>	<b>342</b>	<b>2,399,114</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>(38,939)</b>	<b>346</b>	<b>343</b>	<b>2,360,175</b>	<b>2</b>	<b>2</b>	<b>(91,354)</b>	<b>348</b>	<b>345</b>	<b>2,268,821</b>
<b>TRANSFERS</b>																
Transfer to OIG	0	0	1,302	0	0	0	0	0	0	1,302	0	0	0	0	0	1,302
<b>Total PAC Transfers/Rescissions</b>	<b>0</b>	<b>0</b>	<b>1,302</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,302</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,302</b>
<b>SUBTOTAL APPROPRIATION</b>	<b>346</b>	<b>342</b>	<b>2,400,416</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>(38,939)</b>	<b>346</b>	<b>343</b>	<b>2,361,477</b>	<b>2</b>	<b>2</b>	<b>(91,354)</b>	<b>348</b>	<b>345</b>	<b>2,270,123</b>

**OTHER ACCOUNTS (DISCRETIONARY)**  
(\$ in Thousands)

FY 2017 PROPOSED OPERATING PLAN					FY 2017		FY 2017						FY 2017		FY 2017	
	POS	FTE	FY 2016 Enacted	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	FY 2017 Base	POS	FTE	FY 2017 Program Changes	POS	FTE	President's Budget
<b>NOS</b>																
National Oceans and Coastal Security Fund Obligations	0	0	0	0	0	0	0	0	0	0	1	1	10,000	1	1	10,000
National Oceans and Coastal Security Fund Budget Authority	0	0	0	0	0	0	0	0	0	0	1	1	10,000	1	1	10,000
National Oceans and Coastal Security Fund Appropriation	0	0	0	0	0	0	0	0	0	0	1	1	10,000	1	1	10,000
<b>Subtotal, NOS Other Discretionary Direct Obligation</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>10,000</b>	<b>1</b>	<b>1</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>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>10,000</b>	<b>1</b>	<b>1</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>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>10,000</b>	<b>1</b>	<b>1</b>	<b>10,000</b>
<b>NMFS</b>																
Fishermen's Contingency Fund Obligations	0	0	350	0	0	0	0	0	0	350	0	0	0	0	0	350
Fishermen's Contingency Fund Budget Authority	0	0	350	0	0	0	0	0	0	350	0	0	0	0	0	350
Fishermen's Contingency Fund Appropriations	0	0	350	0	0	0	0	0	0	350	0	0	0	0	0	350
Foreign Fishing Observer Fund Obligations	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Foreign Fishing Observer Fund Budget Authority	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Foreign Fishing Observer Fund Appropriation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fisheries Finance Program Account Obligations	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fisheries Finance Program Account Budget Authority	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fisheries Finance Program Account Appropriation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Promote and Develop Fisheries Obligations	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Promote and Develop Fisheries Budget Authority	0	0	(130,164)	0	0	0	0	0	0	(130,164)	0	0	0	0	0	(130,164)
Promote and Develop Fisheries Appropriation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pacific Coastal Salmon Fund Obligations	2	2	65,000	0	0	0	0	2	2	65,000	0	0	0	2	2	65,000
Pacific Coastal Salmon Fund Budget Authority	2	2	65,000	0	0	0	0	2	2	65,000	0	0	0	2	2	65,000
Pacific Coastal Salmon Fund Appropriation	2	2	65,000	0	0	0	0	2	2	65,000	0	0	0	2	2	65,000
Marine Mammal Unusual Mortality Event Fund Obligations	0	0	50	0	0	0	0	0	0	50	0	0	0	0	0	50
Marine Mammal Unusual Mortality Event Fund Budget Authority	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marine Mammal Unusual Mortality Event Fund Appropriation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fisheries Disaster Assistance Fund Obligations	0	0	0	0	0	0	0	0	0	0	0	0	9,000	0	0	9,000
Fisheries Disaster Assistance Fund Budget Authority	0	0	0	0	0	0	0	0	0	0	0	0	9,000	0	0	9,000
Fisheries Disaster Assistance Fund Appropriation	0	0	0	0	0	0	0	0	0	0	0	0	9,000	0	0	9,000
<b>Subtotal, NMFS Other Discretionary Direct Obligation</b>	<b>2</b>	<b>2</b>	<b>65,400</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>65,400</b>	<b>0</b>	<b>0</b>	<b>9,000</b>	<b>2</b>	<b>2</b>	<b>74,400</b>
<b>Subtotal, NMFS Other Discretionary Budget Authority</b>	<b>2</b>	<b>2</b>	<b>(64,814)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>(64,814)</b>	<b>0</b>	<b>0</b>	<b>9,000</b>	<b>2</b>	<b>2</b>	<b>(55,814)</b>
<b>Subtotal, NMFS Other Discretionary Appropriation</b>	<b>2</b>	<b>2</b>	<b>65,350</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>65,350</b>	<b>0</b>	<b>0</b>	<b>9,000</b>	<b>2</b>	<b>2</b>	<b>74,350</b>



**OTHER ACCOUNTS (DISCRETIONARY)**  
(\$ in Thousands)

FY 2017 PROPOSED OPERATING PLAN																
	POS	FTE	FY 2016 Enacted	POS	FTE	FY 2017 Calculated ATBs	FY 2017 Technical ATBs	POS	FTE	FY 2017 Base	POS	FTE	FY 2017 Program Changes	POS	FTE	FY 2017 President's Budget
<b>OMAO</b>																
Medicare Eligible Retiree Healthcare Fund Acct Obligations	0	0	1,936	0	0	0	0	0	0	1,936	0	0	0	0	0	1,936
Medicare Eligible Retiree Healthcare Fund Acct Budget Authority	0	0	1,936	0	0	0	0	0	0	1,936	0	0	0	0	0	1,936
Medicare Eligible Retiree Healthcare Fund Acct Appropriations	0	0	1,936	0	0	0	0	0	0	1,936	0	0	0	0	0	1,936
<b>Subtotal, OMAO Other Discretionary Direct Obligations</b>	<b>0</b>	<b>0</b>	<b>1,936</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,936</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,936</b>
<b>Subtotal, OMAO Other Discretionary Budget Authority</b>	<b>0</b>	<b>0</b>	<b>1,936</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,936</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,936</b>
<b>Subtotal, OMAO Other Discretionary Appropriation</b>	<b>0</b>	<b>0</b>	<b>1,936</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,936</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,936</b>
<b>TOTAL, OTHER DISCRETIONARY DIRECT OBLIGATIONS</b>	<b>2</b>	<b>2</b>	<b>67,336</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>67,336</b>	<b>1</b>	<b>1</b>	<b>19,000</b>	<b>3</b>	<b>3</b>	<b>86,336</b>
<b>TOTAL, OTHER DISCRETIONARY BUDGET AUTHORITY</b>	<b>2</b>	<b>2</b>	<b>(62,878)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>(62,878)</b>	<b>1</b>	<b>1</b>	<b>19,000</b>	<b>3</b>	<b>3</b>	<b>(43,878)</b>
<b>TOTAL, OTHER DISCRETIONARY APPROPRIATION</b>	<b>2</b>	<b>2</b>	<b>67,286</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>67,286</b>	<b>1</b>	<b>1</b>	<b>19,000</b>	<b>3</b>	<b>3</b>	<b>86,286</b>

SUMMARY OF DISCRETIONARY RESOURCES  
(\$ in Thousands)

FY 2017 PROPOSED OPERATING PLAN																
	POS	FTE	FY 2016 Enacted	POS	FTE	FY 2017 Calculated ATBs	FY 2017 Technical ATBs	POS	FTE	FY 2017 Base	POS	FTE	FY 2017 Program Changes	POS	FTE	FY 2017 President's Budget
<b>Discretionary Direct Obligations</b>																
ORF Direct Obligations	12,444	11,860	3,453,477	0	7	47,600	65,985	12,444	11,867	3,567,062	24	(4)	74,782	12,468	11,863	3,641,844
PAC Direct Obligations	346	342	2,412,114	0	1	0	(38,939)	346	343	2,373,175	2	2	(91,354)	348	345	2,281,821
OTHER Direct Obligations	2	2	67,336	0	0	0	0	2	2	67,336	1	1	19,000	3	3	86,336
<b>TOTAL Discretionary Direct Obligations</b>	<b>12,792</b>	<b>12,204</b>	<b>5,932,927</b>	<b>0</b>	<b>8</b>	<b>47,600</b>	<b>27,046</b>	<b>12,792</b>	<b>12,212</b>	<b>6,007,573</b>	<b>27</b>	<b>(1)</b>	<b>2,428</b>	<b>12,819</b>	<b>12,211</b>	<b>6,010,001</b>
<b>Discretionary Budget Authority</b>																
ORF Budget Authority	12,444	11,860	3,435,977	0	7	47,600	65,985	12,444	11,867	3,549,562	24	(4)	74,782	12,468	11,863	3,624,344
PAC Budget Authority	346	342	2,399,114	0	1	0	(38,939)	346	343	2,360,175	2	2	(91,354)	348	345	2,268,821
OTHER Budget Authority	2	2	(62,878)	0	0	0	0	2	2	(62,878)	1	1	19,000	3	3	(43,878)
<b>TOTAL Discretionary Budget Authority</b>	<b>12,792</b>	<b>12,204</b>	<b>5,772,213</b>	<b>0</b>	<b>8</b>	<b>47,600</b>	<b>27,046</b>	<b>12,792</b>	<b>12,212</b>	<b>5,846,859</b>	<b>27</b>	<b>(1)</b>	<b>2,428</b>	<b>12,819</b>	<b>12,211</b>	<b>5,849,287</b>
<b>Discretionary Appropriations</b>																
ORF Appropriations	12,444	11,860	3,305,813	0	7	47,600	65,985	12,444	11,867	3,419,398	24	(4)	74,782	12,468	11,863	3,494,180
PAC Appropriations	346	342	2,400,416	0	1	0	(38,939)	346	343	2,361,477	2	2	(91,354)	348	345	2,270,123
OTHER Appropriations	2	2	67,286	0	0	0	0	2	2	67,286	1	1	19,000	3	3	86,286
<b>TOTAL Discretionary Appropriation</b>	<b>12,792</b>	<b>12,204</b>	<b>5,773,515</b>	<b>0</b>	<b>8</b>	<b>47,600</b>	<b>27,046</b>	<b>12,792</b>	<b>12,212</b>	<b>5,848,161</b>	<b>27</b>	<b>(1)</b>	<b>2,428</b>	<b>12,819</b>	<b>12,211</b>	<b>5,850,589</b>

**GRAND TOTAL SUMMARY**  
**Discretionary Appropriations**  
(\$ in Thousands)

FY 2017 PROPOSED OPERATING PLAN																
	POS	FTE	FY 2016 Enacted	POS	FTE	FY 2017 Calculated ATBs	FY 2017 Technical ATBs	POS	FTE	FY 2017 Base	POS	FTE	FY 2017 Program Changes	POS	FTE	FY 2017 President's Budget
Operations, Research and Facilities	12,444	11,860	3,305,813	0	7	47,600	65,985	12,444	11,867	3,419,398	24	(4)	74,782	12,468	11,863	3,494,180
Procurement, Acquisition and Construction	346	342	2,400,416	0	1	0	(38,939)	346	343	2,361,477	2	2	(91,354)	348	345	2,270,123
National Oceans and Coastal Security Fund	0	0	0	0	0	0	0	0	0	0	1	1	10,000	1	1	10,000
Fisherman's Contingency Fund	0	0	350	0	0	0	0	0	0	350	0	0	0	0	0	350
Foreign Fishing Observer Fund	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fisheries Financing Program Account	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pacific Coastal Salmon Fund	2	2	65,000	0	0	0	0	2	2	65,000	0	0	0	2	2	65,000
Fisheries Disaster Assistance Fund	0	0	0	0	0	0	0	0	0	0	0	0	9,000	0	0	9,000
Marine Mammal Unusual Mortality Event Fund	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Medicare Eligible Retiree Health Care Fund	0	0	1,936	0	0	0	0	0	0	1,936	0	0	0	0	0	1,936
<b>GRAND TOTAL DISCRETIONARY APPROPRIATION</b>	<b>12,792</b>	<b>12,204</b>	<b>5,773,515</b>	<b>0</b>	<b>8</b>	<b>47,600</b>	<b>27,046</b>	<b>12,792</b>	<b>12,212</b>	<b>5,848,161</b>	<b>27</b>	<b>(1)</b>	<b>2,428</b>	<b>12,819</b>	<b>12,211</b>	<b>5,850,589</b>

**OTHER ACCOUNTS (MANDATORY)**  
(\$ in Thousands)

FY 2017 PROPOSED OPERATING PLAN																
	POS	FTE	FY 2016 Enacted	POS	FTE	FY 2017 Calculated ATBs	FY 2017 Technical ATBs	POS	FTE	FY 2017 Base	POS	FTE	FY 2017 Program Changes	POS	FTE	FY 2017 President's Budget
<b>NOS</b>																
Damage Assessment & Restoration Revolving Fund Obligations	16	16	97,568	0	0	0	(75,600)	16	16	21,968	0	0	0	16	16	21,968
Damage Assessment & Restoration Revolving Fund Budget Authority	16	16	5,968	0	0	0		16	16	5,968	0	0	0	16	16	5,968
Damage Assessment & Restoration Revolving Fund Appropriation	16	16	0	0	0	0		16	16	0	0	0	0	16	16	0
Sanctuaries Enforcement Asset Forfeiture Fund Obligations	0	0	125	0	0	0	(5)	0	0	120	0	0	0	0	0	120
Sanctuaries Enforcement Asset Forfeiture Fund Budget Authority	0	0	125	0	0	0	(5)	0	0	120	0	0	0	0	0	120
Sanctuaries Enforcement Asset Forfeiture Fund Appropriation	0	0	120	0	0	0		0	0	120	0	0	0	0	0	120
Gulf Coast Ecosystem Restoration Fund Obligations	1	1	354	0	0	0	5,362	1	1	5,716	0	0	0	1	1	5,716
Gulf Coast Ecosystem Restoration Fund Budget Authority	1	1	0	0	0	0	0	1	1	0	0	0	0	1	1	0
Gulf Coast Ecosystem Restoration Fund Appropriation	1	1	0	0	0	0	0	1	1	0	0	0	0	1	1	0
<b>Subtotal, NOS Other Mandatory Direct Obligations</b>	<b>17</b>	<b>17</b>	<b>98,047</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>(70,243)</b>	<b>17</b>	<b>17</b>	<b>27,804</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>17</b>	<b>17</b>	<b>27,804</b>
<b>Subtotal, NOS Other Mandatory Budget Authority</b>	<b>17</b>	<b>17</b>	<b>6,093</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>(5)</b>	<b>17</b>	<b>17</b>	<b>6,088</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>17</b>	<b>17</b>	<b>6,088</b>
<b>Subtotal, NOS Other Mandatory Appropriation</b>	<b>17</b>	<b>17</b>	<b>120</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>17</b>	<b>17</b>	<b>120</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>17</b>	<b>17</b>	<b>120</b>
<b>NMFS</b>																
Promote and Develop Fisheries Obligations	0	0	16,225	0	0	0	(578)	0	0	15,647	0	0	0	0	0	15,647
Promote and Develop Fisheries Budget Authority	0	0	146,389	0	0	0	(578)	0	0	145,811	0	0	0	0	0	145,811
Promote and Develop Fisheries Appropriation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fisheries Finance Program Account Obligations	0	0	11,819	0	0	0	(11,819)	0	0	0	0	0	0	0	0	0
Fisheries Finance Program Account Budget Authority	0	0	11,819	0	0	0	(11,819)	0	0	0	0	0	0	0	0	0
Fisheries Finance Program Account Appropriation	0	0	11,819	0	0	0	(11,819)	0	0	0	0	0	0	0	0	0
Federal Ship Financing Obligations	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Ship Financing Budget Authority	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Ship Financing Appropriation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Environmental Improve & Restoration Fund Obligations	0	0	8,815	0	0	0	(7,671)	0	0	1,144	0	0	0	0	0	1,144
Environmental Improve & Restoration Fund Budget Authority	0	0	9,359	0	0	0	(5,187)	0	0	4,172	0	0	0	0	0	4,172
Environmental Improve & Restoration Fund Appropriation	0	0	10,042	0	0	0	(5,566)	0	0	4,476	0	0	0	0	0	4,476
Limited Access System Administration Fund Obligations	38	38	12,636	0	0	0	106	38	38	12,742	0	0	0	38	38	12,742
Limited Access System Administration Fund Budget Authority	38	38	12,507	0	0	0	72	38	38	12,579	0	0	0	38	38	12,579
Limited Access System Administration Fund Appropriation	38	38	12,492	0	0	0	92	38	38	12,584	0	0	0	38	38	12,584

**OTHER ACCOUNTS (MANDATORY)**  
(\$ in Thousands)

FY 2017 PROPOSED OPERATING PLAN																
	POS	FTE	FY 2016 Enacted	POS	FTE	FY 2017 Calculated ATBs	FY 2017 Technical ATBs	POS	FTE	FY 2017 Base	POS	FTE	FY 2017 Program Changes	POS	FTE	FY 2017 President's Budget
Western Pacific Sustainable Fisheries Fund Obligations	0	0	391	0	0	0	9	0	0	400	0	0	0	0	0	400
Western Pacific Sustainable Fisheries Fund Budget Authority	0	0	391	0	0	0	9	0	0	400	0	0	0	0	0	400
Western Pacific Sustainable Fisheries Fund Appropriation	0	0	400	0	0	0	0	0	0	400	0	0	0	0	0	400
Fisheries Enforcement Asset Forfeiture Fund Obligations	0	0	2,870	0	0	0	23	0	0	2,893	0	0	0	0	0	2,893
Fisheries Enforcement Asset Forfeiture Fund Budget Authority	0	0	4,020	0	0	0	(20)	0	0	4,000	0	0	0	0	0	4,000
Fisheries Enforcement Asset Forfeiture Fund Appropriation	0	0	4,000	0	0	0	0	0	0	4,000	0	0	0	0	0	4,000
North Pacific Observer Fund Obligations	0	0	4,050	0	0	0	(80)	0	0	3,970	0	0	0	0	0	3,970
North Pacific Observer Fund Budget Authority	0	0	4,050	0	0	0	(80)	0	0	3,970	0	0	0	0	0	3,970
North Pacific Observer Fund Appropriation	0	0	3,970	0	0	0	0	0	0	3,970	0	0	0	0	0	3,970
<b>Subtotal, NMFS Other Mandatory Direct Obligations</b>	<b>38</b>	<b>38</b>	<b>56,806</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>(20,010)</b>	<b>38</b>	<b>38</b>	<b>36,796</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>38</b>	<b>38</b>	<b>36,796</b>
<b>Subtotal, NMFS Other Mandatory Budget Authority</b>	<b>38</b>	<b>38</b>	<b>188,535</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>(17,603)</b>	<b>38</b>	<b>38</b>	<b>170,932</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>38</b>	<b>38</b>	<b>170,932</b>
<b>Subtotal, NMFS Other Mandatory Appropriation</b>	<b>38</b>	<b>38</b>	<b>42,723</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>(17,293)</b>	<b>38</b>	<b>38</b>	<b>25,430</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>38</b>	<b>38</b>	<b>25,430</b>
<b>OMAO</b>																
NOAA Corp Commissioned Officers Retirement Obligations	0	0	29,375	0	0	0	0	0	0	29,375	0	0	0	0	0	29,375
NOAA Corp Commissioned Officers Retirement Budget Authority	0	0	29,375	0	0	0	0	0	0	29,375	0	0	0	0	0	29,375
NOAA Corp Commissioned Officers Retirement Budget Appropriation	0	0	29,375	0	0	0	0	0	0	29,375	0	0	0	0	0	29,375
Recapitalized Research Fleet Obligations	0	0	0	0	0	0	0	0	0	0	0	0	[100,000]	0	0	[100,000]
Recapitalized Research Fleet Budget Authority	0	0	0	0	0	0	0	0	0	0	0	0	[100,000]	0	0	[100,000]
Recapitalized Research Fleet Appropriation	0	0	0	0	0	0	0	0	0	0	0	0	[100,000]	0	0	[100,000]
<b>Subtotal, OMAO Other Mandatory Direct Obligations</b>	<b>0</b>	<b>0</b>	<b>29,375</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>29,375</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>29,375</b>
<b>Subtotal, OMAO Other Mandatory Budget Authority</b>	<b>0</b>	<b>0</b>	<b>29,375</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>29,375</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>29,375</b>
<b>Subtotal, OMAO Other Mandatory Appropriation</b>	<b>0</b>	<b>0</b>	<b>29,375</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>29,375</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>29,375</b>
<b>TOTAL, OTHER MANDATORY DIRECT OBLIGATIONS</b>	<b>55</b>	<b>55</b>	<b>184,228</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>(90,253)</b>	<b>55</b>	<b>55</b>	<b>93,975</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>55</b>	<b>55</b>	<b>93,975</b>
<b>TOTAL, OTHER MANDATORY BUDGET AUTHORITY</b>	<b>55</b>	<b>55</b>	<b>224,003</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>(17,608)</b>	<b>55</b>	<b>55</b>	<b>206,395</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>55</b>	<b>55</b>	<b>206,395</b>
<b>TOTAL, OTHER MANDATORY APPROPRIATION</b>	<b>55</b>	<b>55</b>	<b>72,218</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>(17,293)</b>	<b>55</b>	<b>55</b>	<b>54,925</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>55</b>	<b>55</b>	<b>54,925</b>

**NOAA SUMMARY**  
(\$ in Thousands)

FY 2017 PROPOSED OPERATING PLAN																
	POS	FTE	FY 2016 Enacted	POS	FTE	FY 2017 Calculated ATBs	FY 2017 Technical ATBs	POS	FTE	FY 2017 Base	POS	FTE	FY 2017 Program Changes	POS	FTE	FY 2017 President's Budget
<b>TOTAL Direct Obligations (Discretionary &amp; Mandatory)</b>	12,847	12,259	6,117,155	0	8	47,600	(63,207)	12,847	12,267	6,101,548	27	(1)	2,428	12,874	12,266	6,103,976
<b>TOTAL Budget Authority (Discretionary &amp; Mandatory)</b>	12,847	12,259	5,996,216	0	8	47,600	9,438	12,847	12,267	6,053,254	27	(1)	2,428	12,874	12,266	6,055,682
<b>TOTAL Appropriation (Discretionary &amp; Mandatory)</b>	12,847	12,259	5,845,733	0	8	47,600	9,753	12,847	12,267	5,903,086	27	(1)	2,428	12,874	12,266	5,905,514
Reimbursable Financing	706	706	393,089	0	0	0	(151,089)	706	706	242,000	0	0	0	706	706	242,000
<b>TOTAL OBLIGATIONS (Direct &amp; Reimbursable)</b>	<b>13,553</b>	<b>12,965</b>	<b>6,510,244</b>	<b>0</b>	<b>8</b>	<b>47,600</b>	<b>(214,296)</b>	<b>13,553</b>	<b>12,973</b>	<b>6,343,548</b>	<b>27</b>	<b>(1)</b>	<b>2,428</b>	<b>13,580</b>	<b>12,972</b>	<b>6,345,976</b>
Offsetting Receipts	0	0	(3,835)	0	0	0	3,425	0	0	(410)	0	0	0	0	0	(410)
<b>TOTAL OBLIGATIONS (Direct, Reimbursable &amp; Offsetting Receipts )</b>	<b>13,553</b>	<b>12,965</b>	<b>6,506,409</b>	<b>0</b>	<b>8</b>	<b>47,600</b>	<b>(210,871)</b>	<b>13,553</b>	<b>12,973</b>	<b>6,343,138</b>	<b>27</b>	<b>(1)</b>	<b>2,428</b>	<b>13,580</b>	<b>12,972</b>	<b>6,345,566</b>

**LINE OFFICE SUMMARY**  
(\$ in Thousands)

FY 2017 PROPOSED OPERATING PLAN					FY 2017				FY 2017				FY 2017		FY 2017	
	POS	FTE	Enacted	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	Base	POS	FTE	Program Changes	POS	FTE	President's Budget
<b>National Ocean Service</b>																
ORF	1,257	1,195	500,100	0	0	4,519	640	1,257	1,195	505,259	2	2	23,152	1,259	1,197	528,411
PAC	5	5	3,700	0	0	0	0	5	5	3,700	0	0	0	5	5	3,700
OTHER	17	17	98,047	0	0	0	(70,243)	17	17	27,804	1	1	10,000	18	18	37,804
<b>TOTAL, NOS</b>	<b>1,279</b>	<b>1,217</b>	<b>601,847</b>	<b>0</b>	<b>0</b>	<b>4,519</b>	<b>(69,603)</b>	<b>1,279</b>	<b>1,217</b>	<b>536,763</b>	<b>3</b>	<b>3</b>	<b>33,152</b>	<b>1,282</b>	<b>1,220</b>	<b>569,915</b>
<b>National Marine Fisheries Service</b>																
ORF	3,053	2,903	849,497	0	5	9,859	2,592	3,053	2,908	861,948	51	38	42,786	3,104	2,946	904,734
PAC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	40	40	122,206	0	0	0	(20,010)	40	40	102,196	0	0	9,000	40	40	111,196
<b>TOTAL, NMFS</b>	<b>3,093</b>	<b>2,943</b>	<b>971,703</b>	<b>0</b>	<b>5</b>	<b>9,859</b>	<b>(17,418)</b>	<b>3,093</b>	<b>2,948</b>	<b>964,144</b>	<b>51</b>	<b>38</b>	<b>51,786</b>	<b>3,144</b>	<b>2,986</b>	<b>1,015,930</b>
<b>Oceanic and Atmospheric Research</b>																
ORF	775	733	461,898	0	2	3,037	4,017	775	735	468,952	10	9	24,458	785	744	493,410
PAC	0	0	20,079	0	0	0	0	0	0	20,079	0	0	6,300	0	0	26,379
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL, OAR</b>	<b>775</b>	<b>733</b>	<b>481,977</b>	<b>0</b>	<b>2</b>	<b>3,037</b>	<b>4,017</b>	<b>775</b>	<b>735</b>	<b>489,031</b>	<b>10</b>	<b>9</b>	<b>30,758</b>	<b>785</b>	<b>744</b>	<b>519,789</b>
<b>National Weather Service</b>																
ORF	4,851	4,616	988,834	0	0	13,038	656	4,851	4,616	1,002,528	(86)	(89)	(26,021)	4,765	4,527	976,507
PAC	23	22	135,315	0	0	0	0	23	22	135,315	0	0	7,470	23	22	142,785
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL, NWS</b>	<b>4,874</b>	<b>4,638</b>	<b>1,124,149</b>	<b>0</b>	<b>0</b>	<b>13,038</b>	<b>656</b>	<b>4,874</b>	<b>4,638</b>	<b>1,137,843</b>	<b>(86)</b>	<b>(89)</b>	<b>(18,551)</b>	<b>4,788</b>	<b>4,549</b>	<b>1,119,292</b>
<b>National Environmental Satellite, Data and Information Service</b>																
ORF	577	577	189,086	0	0	2,973	39,458	577	577	231,517	2	2	8,470	579	579	239,987
PAC	312	310	2,160,270	0	0	0	(38,939)	312	310	2,121,331	0	0	(57,631)	312	310	2,063,700
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL, NESDIS</b>	<b>889</b>	<b>887</b>	<b>2,349,356</b>	<b>0</b>	<b>0</b>	<b>2,973</b>	<b>519</b>	<b>889</b>	<b>887</b>	<b>2,352,848</b>	<b>2</b>	<b>2</b>	<b>(49,161)</b>	<b>891</b>	<b>889</b>	<b>2,303,687</b>
<b>Mission Support</b>																
ORF	935	887	252,931	0	0	10,132	18,508	935	887	281,571	45	34	(63)	980	921	281,508
PAC	0	0	1,000	0	0	0	0	0	0	1,000	2	2	3,557	2	2	4,557
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>SUBTOTAL, Mission Support</b>	<b>935</b>	<b>887</b>	<b>253,931</b>	<b>0</b>	<b>0</b>	<b>10,132</b>	<b>18,508</b>	<b>935</b>	<b>887</b>	<b>282,571</b>	<b>47</b>	<b>36</b>	<b>3,494</b>	<b>982</b>	<b>923</b>	<b>286,065</b>
<b>Office of Marine and Aviation Operations</b>																
ORF	996	949	211,131	0	0	4,042	114	996	949	215,287	0	0	2,000	996	949	217,287
PAC	6	5	91,750	0	1	0	0	6	6	91,750	0	0	(51,050)	6	6	40,700
OTHER	0	0	31,311	0	0	0	0	0	0	31,311	0	0	0	0	0	31,311
<b>TOTAL, OMAO</b>	<b>1,002</b>	<b>954</b>	<b>334,192</b>	<b>0</b>	<b>1</b>	<b>4,042</b>	<b>114</b>	<b>1,002</b>	<b>955</b>	<b>338,348</b>	<b>0</b>	<b>0</b>	<b>(49,050)</b>	<b>1,002</b>	<b>955</b>	<b>289,298</b>

**LINE OFFICE SUMMARY**  
(\$ in Thousands)

FY 2017 PROPOSED OPERATING PLAN																
	POS	FTE	FY 2016 Enacted	POS	FTE	FY 2017 Calculated ATBs	FY 2017 Technical ATBs	POS	FTE	FY 2017 Base	POS	FTE	FY 2017 Program Changes	POS	FTE	FY 2017 President's Budget
<b>DIRECT OBLIGATIONS</b>																
ORF	12,444	11,860	3,453,477	0	7	47,600	65,985	12,444	11,867	3,567,062	24	(4)	74,782	12,468	11,863	3,641,844
PAC	346	342	2,412,114	0	1	0	(38,939)	346	343	2,373,175	2	2	(91,354)	348	345	2,281,821
OTHER	57	57	251,564	0	0	0	(90,253)	57	57	161,311	1	1	19,000	58	58	180,311
<b>TOTAL, DIRECT OBLIGATIONS</b>	<b>12,847</b>	<b>12,259</b>	<b>6,117,155</b>	<b>0</b>	<b>8</b>	<b>47,600</b>	<b>(63,207)</b>	<b>12,847</b>	<b>12,267</b>	<b>6,101,548</b>	<b>27</b>	<b>(1)</b>	<b>2,428</b>	<b>12,874</b>	<b>12,266</b>	<b>6,103,976</b>
ORF Adjustments (Deobligations/Rescissions)	0	0	(17,500)	0	0	0	0	0	0	(17,500)	0	0	0	0	0	(17,500)
ORF Transfers	0	0	(130,164)	0	0	0	0	0	0	(130,164)	0	0	0	0	0	(130,164)
PAC Adjustments (Deobligations/Rescissions)	0	0	(13,000)	0	0	0	0	0	0	(13,000)	0	0	0	0	0	(13,000)
PAC Transfers	0	0	1,302	0	0	0	0	0	0	1,302	0	0	0	0	0	1,302
OTHER Discretionary Adjustments	0	0	(50)	0	0	0	0	0	0	(50)	0	0	0	0	0	(50)
Mandatory Accounts Excluded	(55)	(55)	(184,228)	0	0	0	90,253	(55)	(55)	(93,975)	0	0	0	(55)	(55)	(93,975)
<b>TOTAL, DISCRETIONARY APPROPRIATIONS</b>	<b>12,792</b>	<b>12,204</b>	<b>5,773,515</b>	<b>0</b>	<b>8</b>	<b>47,600</b>	<b>27,046</b>	<b>12,792</b>	<b>12,212</b>	<b>5,848,161</b>	<b>27</b>	<b>(1)</b>	<b>2,428</b>	<b>12,819</b>	<b>12,211</b>	<b>5,850,589</b>



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

	Positions	FTE	Appropriation	Budget Authority	Direct Obligations
FY 2016 Currently Available	12,444	11,860	3,305,813	3,435,977	3,561,622
less: Carryover	0	0	0	0	(108,145)
plus: 2017 Other Adjustments to Base	0	7	113,585	113,585	113,585
FY 2017 Base	12,444	11,867	3,419,398	3,549,562	3,567,062
plus(or less): 2017 Program Changes	24	(4)	74,782	74,782	74,782
FY 2017 Estimate	12,468	11,863	3,494,180	3,624,344	3,641,844

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

Comparison by program		FY 2015		FY 2016		FY 2017		FY 2017		Increase/ (Decrease)	
		Actual		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
National Ocean Service	Pos/BA	1,127	478,464	1,257	500,100	1,257	505,259	1,259	528,411	2	23,152
	FTE/OBL	1,124	473,715	1,195	515,938	1,195	505,259	1,197	528,411	2	23,152
National Marine Fisheries Service	Pos/BA	2,706	817,737	3,053	849,497	3,053	861,948	3,104	904,734	51	42,786
	FTE/OBL	2,702	817,857	2,903	876,439	2,908	861,948	2,946	904,734	38	42,786
Oceanic and Atmospheric Research	Pos/BA	581	430,521	775	461,898	775	468,952	785	493,410	10	24,458
	FTE/OBL	580	433,329	733	472,710	735	468,952	744	493,410	9	24,458
National Weather Service	Pos/BA	4,267	948,910	4,851	988,834	4,851	1,002,528	4,765	976,507	(86)	(26,021)
	FTE/OBL	4,255	975,800	4,616	1,025,201	4,616	1,002,528	4,527	976,507	(89)	(26,021)
National Environmental Satellite, Data, & Info Service	Pos/BA	501	187,563	577	189,086	577	231,517	579	239,987	2	8,470
	FTE/OBL	499	188,926	577	191,446	577	231,517	579	239,987	2	8,470
Mission Support	Pos/BA	756	251,982	935	252,931	935	281,571	980	281,508	45	(63)
	FTE/OBL	751	269,137	887	265,029	887	281,571	921	281,508	34	(63)
Office of Marine and Aviation Operations	Pos/BA	924	205,464	996	211,131	996	215,287	996	217,287	0	2,000
	FTE/OBL	922	209,224	949	214,859	949	215,287	949	217,287	0	2,000
Less Deobligations/Other	Pos/BA	0	0	0	(17,500)	0	(17,500)	0	(17,500)	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
Total	Pos/BA	10,862	3,320,641	12,444	3,435,977	12,444	3,549,562	12,468	3,624,344	24	74,782
	FTE/OBL	10,833	3,367,988	11,860	3,561,622	11,867	3,567,062	11,863	3,641,844	(4)	74,782

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

	FY 2015		FY 2016		FY 2017		FY 2017		Increase/ (Decrease)	
	FTE	Actual Amount	FTE	Currently Available Amount	FTE	Base Program Amount	FTE	Estimate Amount	FTE	Amount
Direct Discretionary Obligation	10,833	3,367,988	11,860	3,561,622	11,867	3,567,062	11,863	3,641,844	(4)	74,782
<b>Total Obligations</b>	<b>10,833</b>	<b>3,367,988</b>	<b>11,860</b>	<b>3,561,622</b>	<b>11,867</b>	<b>3,567,062</b>	<b>11,863</b>	<b>3,641,844</b>	<b>(4)</b>	<b>74,782</b>
<b>Adjustments to Obligations:</b>										
Cash Refunds/Prior Year Recoveries	0	(1,004)	0	0	0	0	0	0	0	0
Deobligations	0	(22,891)	0	(17,500)	0	(17,500)	0	(17,500)	0	0
Unobligated balance, EOY	0	108,145	0	0	0	0	0	0	0	0
Unobligated Balance Expiring	0	2,021	0	0	0	0	0	0	0	0
Unobligated Balance Adj SOY	0	(146,618)	0	(121,145)	0	0	0	0	0	0
Unobligated balance, Adj EOY	0	0	0	0	0	0	0	0	0	0
Unobligated balance transferred	0	0	0	0	0	0	0	0	0	0
Unobligated balance, Not Apportioned	0	13,000	0	13,000	0	0	0	0	0	0
<b>Total Budget Authority</b>	<b>10,833</b>	<b>3,320,641</b>	<b>11,860</b>	<b>3,435,977</b>	<b>11,867</b>	<b>3,549,562</b>	<b>11,863</b>	<b>3,624,344</b>	<b>(4)</b>	<b>74,782</b>
<b>Financing from Transfers and Other:</b>										
Transfer from P&D to ORF	0	(116,000)	0	(130,164)	0	(130,164)	0	(130,164)	0	0
Transfer from PCSRF to ORF	0	(65)	0	0	0	0	0	0	0	0
Transfer from PAC to ORF	0	(2,178)	0	0	0	0	0	0	0	0
<b>Net Appropriation</b>	<b>10,833</b>	<b>3,202,398</b>	<b>11,860</b>	<b>3,305,813</b>	<b>11,867</b>	<b>3,419,398</b>	<b>11,863</b>	<b>3,494,180</b>	<b>(4)</b>	<b>74,782</b>

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**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Operations, Research, and Facilities  
**PROGRAM and PERFORMANCE: REIMBURSABLE OBLIGATIONS**  
(Dollar Amounts in Thousands)

	Positions	FTE	Appropriation	Budget Authority	Reimbursable Obligations
FY 2016 Currently Available	706	706	0	393,089	496,401
less: obligations from prior year balances	0	0	0	0	(103,312)
less: 2017 Other Adjustments to Base	0	0	0	(151,089)	(151,089)
FY 2017 Base	706	706	0	242,000	242,000
less: 2017 Program Changes	0	0	0	0	0
FY 2017 Estimate	706	706	0	242,000	242,000

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Operations, Research, and Facilities  
**PROGRAM and PERFORMANCE: REIMBURSABLE OBLIGATIONS**  
(Dollar Amounts in Thousands)

Comparison by program		FY 2015		FY 2016		FY 2017		FY 2017		Increase/ (Decrease)	
		Actual		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
National Ocean Service	Pos/BA	18	29,945	85	136,713	85	29,000	85	29,000	0	0
	FTE/OBL	18	16,807	85	149,850	85	29,000	85	29,000	0	0
National Marine Fisheries Service	Pos/BA	271	112,582	311	96,186	311	69,000	311	69,000	0	0
	FTE/OBL	271	50,158	311	158,611	311	69,000	311	69,000	0	0
Oceanic and Atmospheric Research	Pos/BA	36	63,634	53	81,384	53	33,000	53	33,000	0	0
	FTE/OBL	36	46,449	53	98,569	53	33,000	53	33,000	0	0
National Weather Service	Pos/BA	169	59,004	174	73,964	174	75,000	174	75,000	0	0
	FTE/OBL	169	51,210	174	81,758	174	75,000	174	75,000	0	0
National Environmental Satellite, Data, and Information Service	Pos/BA	40	28,451	45	3,176	45	21,000	45	21,000	0	0
	FTE/OBL	40	26,133	45	5,494	45	21,000	45	21,000	0	0
Mission Support	Pos/BA	32	13,596	37	1,317	37	12,000	37	12,000	0	0
	FTE/OBL	32	13,245	37	1,668	37	12,000	37	12,000	0	0
Office of Marine and Aviation Operations	Pos/BA	1	354	1	350	1	3,000	1	3,000	0	0
	FTE/OBL	1	253	1	451	1	3,000	1	3,000	0	0
Total	Pos/BA	567	307,566	706	393,089	706	242,000	706	242,000	0	0
	FTE/OBL	567	204,254	706	496,401	706	242,000	706	242,000	0	0

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Operations, Research, and Facilities  
**PROGRAM and PERFORMANCE: REIMBURSABLE OBLIGATIONS**  
(Dollar Amounts in Thousands)

	FY 2015 Actual		FY 2016 Currently Available		FY 2017 Base Program		FY 2017 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Reimbursable Obligations	567	204,254	706	496,401	706	242,000	706	242,000	0	0
<b>Total Obligations</b>	<b>567</b>	<b>204,254</b>	<b>706</b>	<b>496,401</b>	<b>706</b>	<b>242,000</b>	<b>706</b>	<b>242,000</b>	<b>0</b>	<b>0</b>
<b>Adjustments to Obligations:</b>										
Deobligations	0	0	0	0	0	0	0	0	0	0
Unobligated balance, SOY Reimbursable	0	0	0	(103,312)	0	0	0	0	0	0
Unobligated balance, EOY Reimbursable	0	103,312	0	0	0	0	0	0	0	0
Unobligated balance, Expiring	0	0	0	0	0	0	0	0	0	0
<b>Total Budget Authority</b>	<b>567</b>	<b>307,566</b>	<b>706</b>	<b>393,089</b>	<b>706</b>	<b>242,000</b>	<b>706</b>	<b>242,000</b>	<b>0</b>	<b>0</b>

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

	FY 2015 Actual	FY 2016 Currently Available	FY 2017 Base Program	FY 2017 Estimate	Increase/ (Decrease)
Direct Discretionary Obligation	3,367,988	3,561,622	3,567,062	3,641,844	74,782
Direct Mandatory Obligation	26,678	32,637	29,375	29,375	0
Reimbursable Obligation	204,254	496,401	242,000	242,000	0
<b>Total Obligations</b>	<b>3,598,920</b>	<b>4,090,660</b>	<b>3,838,437</b>	<b>3,913,219</b>	<b>74,782</b>
<b>Adjustments and Obligations:</b>					
Federal funds	(171,478)	(302,124)	(186,000)	(186,000)	0
Non-Federal Sources	(56,600)	(90,965)	(56,000)	(56,000)	0
Cash Refunds	(1,004)	0	0	0	0
Change Uncollected Customer Pmts from Fed.	(679)	0	0	0	0
Deobligation/Recoveries	(22,903)	(17,500)	(17,500)	(17,500)	0
Unobligated balance, SOY	(146,618)	(166,587)	0	0	0
Unobligated balance, transferred to other accounts	5	0	0	0	0
Unobligated balance, EOY (Disc.)	108,145	0	0	0	0
Unobligated balance, EOY (Mand.)	2,255	0	0	0	0
Unobligated balance, deferred	44,886	42,180	0	0	0
Unobligated balance, Not apportioned	13,000	13,000	0	0	0
Unobligated balance, SOY Reimbursable	(78,802)	(103,312)	0	0	0
Unobligated balance, Expiring Direct	2,021	0	0	0	0
Unobligated balance, EOY Reimbursable	103,312	0	0	0	0
<b>Total Budget Authority</b>	<b>3,394,460</b>	<b>3,465,352</b>	<b>3,578,937</b>	<b>3,653,719</b>	<b>74,782</b>
<b>Financing from Transfers and Other:</b>					
Transfer from P&D to ORF	(116,000)	(130,164)	(130,164)	(130,164)	0
Transfer from PCSRF to ORF	(65)	0	0	0	0
Spectrum Relocation Fund	(45,550)	0	0	0	0
NOAA Corps Retirement Pay (Mandatory)	(28,269)	(29,375)	(29,375)	(29,375)	0
Transfer from PAC to ORF	(2,178)	0	0	0	0
<b>Net Appropriation</b>	<b>3,202,398</b>	<b>0 3,305,813</b>	<b>0 3,419,398</b>	<b>0 3,494,180</b>	<b>74,782</b>

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**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Operations, Research, and Facilities  
**JUSTIFICATION OF CHANGES TO BASE**  
 (Dollar Amounts in Thousands)

		FTE	Amount
<u>Adjustments:</u>			
Restoration of FY 2016 deobligations	17,500,000	0	44,546
Adjustment for DOC Working Capital Fund	25,568,000		
Adjustment for DOC Accounting Systems	1,478,000		
 <u>Financing:</u>			
In 2017, NOAA expects to realize recoveries of prior year obligations of \$17,500,000. This amount will be used to offset the budget authority in 2017.	(17,500,000)	0	(17,500)
 <u>Transfers:</u>			
NESDIS transfer from PAC Geostationary – R PPA to ORF Satellite & Product Operations, NSOF Operations, Product, Development, Readiness, & Application, National Centers for Environmental Information PPAs.	0		38,939
NESDIS transfer from PAC Jason-3 PPA to ORF Satellite & Product Operations, Product, Development, Readiness, & Application, National Centers for Environmental Information PPAs.	0		33,900,000
NESDIS transfer from PAC DSCOVER PPA to ORF Satellite & Product Operations, National Centers for Environmental Information PPAs.	0		2,931,000
NESDIS transfer from PAC Satellite Ground Systems PPA to ORF Satellite & Product Operations PPA.	0		908,000
NESDIS transfer from PAC Satellite Ground Systems PPA to ORF Satellite & Product Operations PPA.	0		1,200,000
	0		38,939,000

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Operations, Research, and Facilities  
**JUSTIFICATION OF CHANGES TO BASE**  
 (Dollar Amounts in Thousands)

Pay Raises 0                      20,488

Full-year cost of 2017 pay increase and related costs:

The 2016 Budget assumes a pay raise of 1.300% for civilians and a pay raise of 1.300% for military.

Total cost of 2016 pay raise	17,500,749
Less amount funded in 2016	(13,125,562)
Adjustment for FY 2017 of 2016 pay increase	4,375,187

2017 pay increase and related costs:

A general civilian pay raise of 1.600% and NOAA Corp pay raise of 1.600% is assumed to be effective January 1, 2017.

Total cost in 2017 of pay increase	21,484,145
Less amount not funded in 2017	(5,371,036)
Total cost of January 2017 pay increase	16,113,109
Total, adjustment for 2017 pay increase	16,113,109

Full-year cost in 2017 of positions financed for part-year in 2016 7                      538

An increase of \$537,967 is required to fund the full-year cost in 2017 of positions financed for part-year in 2016. The computation follows:

Annual salary of new positions	28	1,961,842
Pay adj of annual salary of new positions		25,504
Less 5 percent lapse		(99,368)
Full-year cost of personnel compensation		1,887,978
Less personnel compensation included in the 2016 budget	(21)	(1,481,149)
Cost of personnel compensation in 2017	7	406,829
Adjustment for 2017 pay raise (x0.75)		3,051
Add'l amount required for personnel compensation	0	409,880
Benefits		128,087
Total adjustments-to-base	7	537,967

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Operations, Research, and Facilities  
**JUSTIFICATION OF CHANGES TO BASE**  
 (Dollar Amounts in Thousands)

<u>Compensable Day</u>		(10,502)
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In FY 2017, there are 260 compensable days, a decrease of two days from 262 days in FY 2016.

<u>Civil Service Retirement System (CSRS)</u>	0	(2,175)
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The number of employees covered by the Civil Service Retirement System (CSRS) continues to drop as positions become vacant and are filled by employees who are covered by Federal Employees Retirement System (FERS). The estimated percentage covered by CSRS will drop from 6.3% in 2016 to 3.4% in 2017 for regular employees and will remain at 0% in 2017 for law enforcement employees. Contribution rates will remain the same at 7.0% for regular employees and 7.5% for law enforcement.

Regular:

2017 \$1,1071,226,000 x 0.034 x .07		2,549,518
2016 \$1,1071,226,000 x 0.063 x .07		(4,724,107)
Subtotal		(2,174,589)

Law Enforcement:

2017 \$5,118,000 x .000 x .075		0
2016 \$5,118,000 x .000 x .075		(0)
Subtotal		0
		(2,174,589)

Total adjustment to base

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Operations, Research, and Facilities  
**JUSTIFICATION OF CHANGES TO BASE**  
 (Dollar Amounts in Thousands)

Federal Employees Retirement System (FERS)

0                      4,256

The number of employees covered by the FERS continues to rise as employees covered by CSRS leave and are replaced by employees covered by FERS. The estimated percentage of payroll for regular employees covered by FERS will rise from 93.7% in 2016 to 96.6% in 2017 for regular employees. The estimated percentage of payroll for law enforcement employees covered by FERS will remain at 100% from FY 2016 to FY 2017. The contribution rate for FERS Regular remains 13.7% while the FERS for Law Enforcement remains 30.1% in 2017.

Regular:

2017 \$1,1071,226,000 x 0.966 x 0.1370	141,768,191
2016 \$1,1071,226,000 x 0.937 x 0.1370	<u>(137,521,210)</u>
Subtotal	4,255,981

Law Enforcement:

2017 \$5,118,000 x 1.00 x 0.301	1,540,518
2016 \$5,118,000 x 1.00 x 0.301	<u>(1,540,518)</u>
Subtotal	0

Total adjustment to base	4,255,981
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Thrift Savings Plan

0                      621

The cost of agency contributions to the Thrift Savings Plan will also rise as FERS participation increases. The contribution rate is 2%.

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Operations, Research, and Facilities  
**JUSTIFICATION OF CHANGES TO BASE**  
 (Dollar Amounts in Thousands)

Regular:	
2017 \$1,1071,226,000 x 0.966 x 0.02	20,696,086
2016 \$1,1071,226,000 x 0.937 x 0.02	<u>(20,074,775)</u>
Subtotal	621,311
Law Enforcement:	
2017 \$5,118,000 x 1.00 x 0.02	102,360
2016 \$5,118,000 x 1.00 x 0.02	<u>(102,360)</u>
Subtotal	0
Total adjustment to base	621,311

Federal Insurance Contribution Act (FICA)

0                      2,245

The maximum salary subject to OASDI tax will increase from \$122,300 in 2016 to \$126,200 in 2017. The OASDI tax rate will remain at 6.2% in 2017.

Regular:	
2017 \$1,1071,226,000 x .966 x .964 x .062	61,848,184
2016 \$1,1071,226,000 x .937 x .96 x .062	<u>(59,742,531)</u>
Subtotal	2,105,653
Law Enforcement:	
2017 \$5,118,000 x 1.0 x .964 x .062	305,893
2016 \$5,118,000 x 1.0 x .96 x .062	<u>(304,623)</u>
Subtotal	1,270

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Operations, Research, and Facilities  
**JUSTIFICATION OF CHANGES TO BASE**  
 (Dollar Amounts in Thousands)

Other		
2017 \$70,168,000 x .966 x .964 x .062		4,051,212
2016 \$70,168,000 x .937 x .96 x .062		(3,913,286)
Subtotal		137,926
 Total adjustment to base		 2,244,849

<u>Health insurance premiums</u>	0	2,586
NOAA's contribution to Federal employees' health insurance premiums will increase. Applied against the 2016 estimate of \$80,814,000, the additional amount required is \$2,586,048.		

<u>Employees Compensation Fund</u>	0	(102)
In FY 2017, NOAA's contribution to Federal employees' compensation fund will decrease by \$102,000.		

<u>Travel</u>	0	52
The General Services Administration did not increase the standard per diem rate in 2017. Effective January 1, 2015, the mileage reimbursement rate for privately-owned automobiles increased from 56 cents to 57.5 cents per mile. Applied against the 2016 estimate of \$1,941,764, the additional amount required is \$52,012.		

<u>Rental payments to GSA</u>	0	2,486
GSA rates are projected to increase 3.0% in 2017. This percentage was applied to the 2016 estimate of \$82,861,000 to arrive at an increase of \$2,485,830.		



**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Operations, Research, and Facilities  
**JUSTIFICATION OF CHANGES TO BASE**  
 (Dollar Amounts in Thousands)

<u>Postage</u>	0	1
<p>Effective January 15, 2015, the U.S. Postal Service implemented a rate increase for shipping. The percentage increase of 1.966% was applied to the 2016 estimate of \$66,000 to arrive at an increase of \$1,298.</p>		
<u>GPO Printing</u>	0	77
<p>The General Pricing Level Adjustment percentage increase of 1.8% was applied to the 2016 estimate of \$4,258,000 to arrive at an increase of \$76,644.</p>		
<u>PEPCO Electricity</u>	0	5
<p>An increase of \$5,000 is requested for PEPCO Electricity.</p>		
<u>NARA Storage &amp; maintenance costs</u>	0	(359)
<p>The estimated cost of NARA storage and maintenance for 2017 is projected to decrease by \$359,038.</p>		
<u>CBS</u>	0	4,780
<p>NOAA requests an increase of \$4,780,000 for the Commerce Business System.</p>		
<u>Federal Protective Services</u>	0	6
<p>Effective July 21, 2015, the Department of Homeland Security announced an increase in Federal Protective Services costs beginning in 2017. The percentage increase of 7.41% was applied to the 2015 projection of \$84,571 to arrive at an increase of \$6,267.</p>		

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Operations, Research, and Facilities  
**JUSTIFICATION OF CHANGES TO BASE**  
 (Dollar Amounts in Thousands)

<u>General Pricing Level Adjustment</u>	0	18,958
This request applies the OMB economic assumption of 1.8% for FY 2017 to object classes where the prices the government pays are established through the market system. Factors are applied to transportation of things (\$244,404); rental payment payments to others (\$567,648); communications, utilities and miscellaneous charges (excluding postage) (\$1,417,824); other contractual services (\$14,293,532); supplies and materials (\$1,612,116) and equipment (\$822,294).		
<u>Working Capital Fund</u>	0	1,649
The amount of \$1,649,000 to fund inflationary costs within the Departmental Working Capital Fund.		
<u>Grants</u>	0	753
Grants are projected to increase by 3.0% in 2017. This percentage was applied to the 2016 estimate of \$25,102,000 to arrive at an increase of \$753,060.		
<u>Ship and Aircraft Fuel Costs</u>	0	1,237
Subtotal, Other Changes	7	47,600
Other Adjustments	0	0
Less: Absorption	0	0
Total Adjustments to Base	7	113,585

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Operations, Research, and Facilities  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
 (Dollars Amounts in Thousands)

Object Class	FY 2015 Actual	FY 2016 Currently Available	FY 2017 Base Program	FY 2017 Estimate	Increase / (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	1,045,941	1,070,923	1,079,544	1,078,977	(567)
11.3 Other than full-time permanent	6,474	6,629	6,578	7,758	1,180
11.5 Other personnel compensation	56,492	57,841	57,649	57,737	88
11.6 Leave Surcharge	(3,498)	(3,582)	(3,582)	(3,582)	0
11.7 Military personnel	33,079	34,975	34,044	34,044	0
11.9 Total Personnel Compensation	1,138,488	1,165,680	1,174,233	1,174,934	701
12 Civilian personnel benefits	363,589	372,273	381,777	382,719	942
13 Benefits for former personnel	24,892	25,769	26,773	26,773	0
21 Travel and transportation of persons	43,480	44,519	44,571	46,010	1,439
22 Transportation of things	13,261	13,578	13,822	13,835	13
23.1 Rental payments to GSA	81,845	82,861	85,347	86,524	1,177
23.2 Rental payments to others	30,800	31,536	32,104	32,706	602
23.3 Communications, utilities and miscellaneous charges	76,995	78,834	80,258	79,012	(1,246)
24 Printing and reproduction	4,159	4,258	4,335	4,411	76
25 Other Contractual Services	0	0	0	0	0
25.1 Advisory and assistance services	177,648	181,891	181,891	205,367	23,476
25.2 Other services from non-Federal sources	520,939	533,099	553,651	571,007	17,356

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Operations, Research, and Facilities  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
(Dollars Amounts in Thousands)

Object Class	FY 2015 Actual	FY 2016 Currently Available	FY 2017 Base Program	FY 2017 Estimate	Increase / (Decrease)
25.3 Other goods and services from Federal sources	111,547	115,273	181,077	186,272	5,195
25.4 Operation and maintenance of facilities	0	0	0	0	0
25.5 Research and development contracts	17,654	18,076	18,076	19,869	1,793
25.7 Operation and maintenance of equipment	0	0	0	0	0
26 Supplies and materials	108,813	111,412	114,260	119,699	5,439
31 Equipment	44,617	45,683	46,505	50,923	4,418
32 Lands and structures	4,154	4,254	4,254	4,259	5
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies, and contributions	631,664	652,751	653,504	666,900	13,396
42 Insurance claims and indemnities	24	0	0	0	0
43 Interest and dividends	96	0	0	0	0
44 Refunds	0	0	0	0	0
99 Total Obligations	3,394,666	3,482,852	3,596,437	3,671,219	74,782

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Operations, Research, and Facilities  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
 (Dollars Amounts in Thousands)

Object Class	FY 2015 Actual	FY 2016 Currently Available	FY 2017 Base Program	FY 2017 Estimate	Increase / (Decrease)
Cash Refunds/Prior Year Recoveries	(1,004)	0	0	0	0
De-obligations	(22,891)	(17,500)	(17,500)	(17,500)	0
Unobligated Balance, Start of Year	(146,618)	0	0	0	0
Unobligated Balance, End of Year	108,145	0	0	0	0
Unobligated Balance, Expiring	2,021	0	0	0	0
Unobligated Balance, not apportioned	13,000	0	0	0	0
Subtotal Budget Authority	3,347,319	3,465,352	3,578,937	3,653,719	74,782
Less: NOAA Corps	(26,570)	(29,375)	(29,375)	(29,375)	0
Less: Spectrum Relocation Fund	(108)	0	0)	0)	0
Total Discretionary ORF Budget Authority	3,320,641	3,435,977	3,549,562	3,624,344	74,782
Positions	10,862	12,444	12,444	12,468	24
FTE	10,833	11,860	11,867	11,863	(4)

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**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Operations, Research, and Facilities  
**PROGRAM/SUB-PROGRAM CHANGE CROSSWALK**  
**Part 1 2016 Structure**  
 (Dollar amounts in thousands)

Program/Sub-program/Program Activity	2017 Direct Obligations	Proposed Changes
<b>Corporate Services</b>		
Under Secretary and Associate Offices		
Under Secretary and Associate Offices Base	\$27,266	Move to Executive Leadership
Subtotal, Under Secretary and Associate Offices		
NOAA Wide Corporate Services & Agency Management		
NOAA Wide Corporate Services & Agency Management Base	\$122,490	Move to Mission Services and Management
DOC Accounting System	\$16,258	Move to Mission Services and Management
Payment to the DOC Working Capital Fund	\$72,512	No change
Subtotal, NOAA Wide Corporate Services & Agency Management		
IT Security		
IT Security	\$10,050	No change
Subtotal, IT Security		
Total, Corporate Services		
Office of Education		
Office of Education	\$16,481	No change
Total, Office of Education		
Facilities		
NOAA Facilities Management & Construction and Safety	\$16,451	Move to Mission Services and Management
Subtotal, NOAA Facilities Management, Construction & Maintenance		

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**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Operations, Research, and Facilities  
**PROGRAM/SUB-PROGRAM CHANGE CROSSWALK**  
**Part 2 2017 Structure**  
 (Dollar Amounts in Thousands)

<b>Program/Sub-program/Program Activity</b>	<b>FY 2014 Spend Plan</b>	<b>FY 2015 Enacted</b>	<b>FY 2016 Enacted</b>	<b>FY 2017 Estimate</b>
Corporate Services				
Under Secretary and Associated Offices				
Under Secretary and Associated Offices	26,958	27,000	27,000	-
Subtotal, Under Secretary and Associated Offices	26,958	27,000	27,000	-
NOAA Wide Corporate Services & Agency Management				
NOAA Wide Corporate Services & Agency Management Base	110,828	109,480	115,000	-
DOC Accounting System	9,984	10,000	10,000	-
Payment to the DOC Working Capital Fund	46,204	40,000	43,000	-
Subtotal, NOAA Wide Corporate Services & Agency Management	167,016	159,480	168,000	-
IT Security				
IT Security	8,287	8,300	8,300	-
Subtotal, IT Security	8,287	8,300	8,300	-
Office of Education				
BWET Regional Programs	7,189	7,200	-	-
Education Partnership Program/Minority Serving Institutions (EPP/MSI)	14,378	14,400	-	-
Office of Education	5,591	6,000	26,631	-
Total, Office of Education	27,158	27,600	26,631	-
Facilities				
NOAA Facilities Management & Construction and Safety	22,964	25,520	23,000	-
Subtotal, NOAA Facilities Management, Construction & Maintenance	22,964	25,520	23,000	-
Total, Facilities	22,964	25,520	23,000	-
Executive Leadership	-	-	-	27,266
Mission Services and Management	-	-	-	155,199
IT Security	-	-	-	10,050
Payment to the DOC Working Capital Fund	-	-	-	72,512
Office of Education	-	-	-	16,481
<b>Total, Mission Support -- ORF</b>	<b>252,383</b>	<b>247,900</b>	<b>252,931</b>	<b>281,508</b>

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**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Operations, Research, and Facilities  
**CONSULTING AND RELATED SERVICES**  
(Dollar Amounts in Thousands)

	<u>2015</u> <u>Actual</u>	<u>2016</u> <u>Estimate</u>	<u>2017</u> <u>Estimate</u>
Management and Professional Support Services	\$69,282	\$70,937	\$76,536
Studies, Analysis and Evaluations	\$28,424	\$29,103	\$31,400
Engineering and Technical Services	\$79,942	\$81,851	\$88,312
Total	<u>\$177,648</u>	<u>\$181,891</u>	<u>\$196,248</u>

Consulting Services are those services of a pure nature relating to the governmental functions of agency administration and management and agency problem management. These services are normally provided by persons or organizations generally considered to have knowledge and special abilities that are not usually available within the agency. Such services can be obtained through personnel appointments, procurement contracts, or advisory committees.

Management and professional services deal with management data collection, policy review or development, program development, review or evaluation, systems engineering and other management support services. Special studies and analyses deal with the highly specialized areas of agency activity, e.g., air quality, chemical, environmental, geophysical, oceanographic, technological, and etc. Management and support services for research and development are procurement actions that meet the description of management and professional services or special studies and analyses but are funded under research and development.

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**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Operations, Research, and Facilities  
**PERIODICAL, PAMPHLETS, AND AUDIOVISUAL PRODUCTS**  
(Dollar Amounts in Thousands)

	<u>2015</u> <u>Actual</u>	<u>2016</u> <u>Estimate</u>	<u>2017</u> <u>Estimate</u>
Periodicals	\$2,017	\$2,065	\$2,115
Pamphlets	\$1,453	\$1,488	\$1,524
Audiovisuals	\$689	\$706	\$723
Total	<hr/> \$4,159	<hr/> \$4,258	<hr/> \$4,361

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**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Operations, Research, and Facilities  
**AVERAGE GRADE AND SALARY**

	<u>2015</u> <u>Estimate</u>	<u>2016</u> <u>Estimate</u>	<u>2017</u> <u>Estimate</u>
Average executive and SES level pay plans	\$171,525	\$173,755	\$176,535
Average GS/GM grade	12	12	12
Average GS/GM salary	\$94,990	\$96,225	\$97,476
Average Pay Band salary	\$103,800	\$105,150	\$106,832
Average Commissioned Officers salary	\$115,122	\$116,618	\$118,484
Average salary for other positions (FWS/Wage Marine)	\$58,885	\$59,651	\$60,605

Average salaries provided here reflect Federal Civilian and Military pay raises for 2016 and 2017, respectively.

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

	Positions	FTE	Appropriation	Budget Authority	Direct Obligations
FY 2016 Currently Available	346	342	2,400,416	2,399,114	2,441,978
Less: Carryover	0	0	0	0	(29,864)
Plus: 2017 Other Adjustments to Base	0	1	(38,939)	(38,939)	(38,939)
FY 2017 Base	346	343	2,361,477	2,360,175	2,373,175
Plus (or less): 2017 Program Changes	2	2	(91,354)	(91,354)	(91,354)
FY 2017 Estimate	348	345	2,270,123	2,268,821	2,281,821

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

Comparison by program/sub-program		FY 2015		FY 2016		FY 2017		FY 2017		Increase/ (Decrease)	
		Actual		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
National Ocean Service	Pos/BA	2	3,674	5	3,700	5	3,700	5	3,700	0	0
	FTE/OBL	2	4,446	5	4,919	5	3,700	5	3,700	0	0
National Marine Fisheries Service	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	67	0	1,888	0	0	0	0	0	0
Oceanic and Atmospheric Research	Pos/BA	0	13,286	0	20,079	0	20,079	0	26,379	0	6,300
	FTE/OBL	0	17,560	0	20,080	0	20,079	0	26,379	0	6,300
National Weather Service	Pos/BA	33	132,377	23	135,315	23	135,315	23	142,785	0	7,470
	FTE/OBL	33	183,048	22	151,431	22	135,315	22	142,785	0	7,470
National Environmental Satellite, Data, & Information Service	Pos/BA	242	2,020,449	312	2,160,270	312	2,121,331	312	2,063,700	0	(57,631)
	FTE/OBL	242	2,029,994	310	2,165,719	310	2,121,331	310	2,063,700	0	(57,631)
Mission Support	Pos/BA	0	0	0	1,000	0	1,000	2	4,557	2	3,557
	FTE/OBL	0	151	0	1,323	0	1,000	2	4,557	2	3,557
Office of Marine and Aviation Operations	Pos/BA	0	5,959	6	91,750	6	91,750	6	40,700	0	(51,050)
	FTE/OBL	0	43,060	5	96,618	6	91,750	6	40,700	0	(51,050)
Less Deobligations/Other	Pos/BA	0	0	0	(13,000)	0	(13,000)	0	(13,000)	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
Total	Pos/BA	277	2,175,745	346	2,399,114	346	2,360,175	348	2,268,821	2	(91,354)
	FTE/OBL	277	2,278,326	342	2,441,978	343	2,373,175	345	2,281,821	2	(91,354)

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

	FY 2015		FY 2016		FY 2017		FY 2017		Increase/ (Decrease)	
	FTE	Actual Amount	FTE	Currently Available Amount	FTE	Base Program Amount	FTE	Estimate Amount	FTE	Amount
Direct Discretionary Obligation	277	2,278,326	342	2,441,978	345	2,373,175	345	2,281,821	0	(91,354)
<b>Total Obligations</b>	<b>277</b>	<b>2,278,326</b>	<b>342</b>	<b>2,441,978</b>	<b>345</b>	<b>2,373,175</b>	<b>345</b>	<b>2,281,821</b>	<b>0</b>	<b>(91,354)</b>
<b>Adjustments to Obligations:</b>										
Cash Refunds	0	(3,326)	0	0	0	0	0	0	0	0
Deobligations	0	(4,963)	0	(13,000)	0	(13,000)	0	(13,000)	0	0
Unobligated Balance Expiring	0	438	0	0	0	0	0	0	0	0
Unobligated Balance Adj SOY	0	(124,594)	0	(29,864)	0	0	0	0	0	0
Unobligated balance, Adj EOY	0	29,864	0	0	0	0	0	0	0	0
Unobligated balance transferred from ORF	0	0	0	0	0	0	0	0	0	0
<b>Total Budget Authority</b>	<b>277</b>	<b>2,175,745</b>	<b>342</b>	<b>2,399,114</b>	<b>345</b>	<b>2,360,175</b>	<b>345</b>	<b>2,268,821</b>	<b>0</b>	<b>(91,354)</b>
<b>Financing from Transfers and Other:</b>										
Transfer from ORF to PAC	0	2,178	0	0	0	0	0	0	0	0
Transfer to OIG	0	1,302	0	1,302	0	1,302	0	1,302	0	0
<b>Net Appropriation</b>	<b>277</b>	<b>2,179,225</b>	<b>342</b>	<b>2,400,416</b>	<b>345</b>	<b>2,361,477</b>	<b>345</b>	<b>2,270,123</b>	<b>0</b>	<b>(91,354)</b>

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**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Procurement, Acquisition, and Construction  
**SUMMARY OF FINANCING**  
(Dollar Amounts in Thousands)

	FY 2015 Actuals	FY 2016 Currently Available	FY 2017 Base Program	FY 2017 Estimate	Increase/ (Decrease)
Direct Discretionary Obligation	2,278,326	2,441,978	2,373,175	2,281,821	(91,354)
Spectrum Relocation Fund (Mandatory)	4,684	142,998	0	0	0
Recapitalized Research Fleet (Mandatory)	0	0	0	[100,000]	[100,000]
<b>Total Obligations</b>	<b>2,283,010</b>	<b>2,584,976</b>	<b>2,373,175</b>	<b>2,281,821</b>	<b>(91,354)</b>
<b>Adjustments and Obligations:</b>					
Cash Refund	(3,326)	0	0	0	0
Recoveries		0	0	0	0
Deobligations	(4,963)	(13,000)	(13,000)	(13,000)	0
Unobligated balance, adj. SOY	(124,594)	(243,283)	0	0	0
Unobligated balance, EOY (Disc.)	29,864	0	0	0	0
Unobligated balance, EOY (Mand.)	7,586	0	0	0	0
Unobligated balance, deferred	205,833	70,421	0	0	0
Unobligated balance, expiring EOY	438	0	0	0	0
Unobligated Balance, transferred from ORF	0	0	0	0	0
<b>Total Budget Authority</b>	<b>2,393,848</b>	<b>2,399,114</b>	<b>2,360,175</b>	<b>2,268,821</b>	<b>(91,354)</b>
<b>Financing from Transfers and Other:</b>					
Transfer from ORF to PAC	2,178	0	0	0	0
Transfer to OIG	1,302	1,302	1,302	1,302	0
Spectrum Relocation Fund (mandatory)	(218,103)	0	0	0	0
<b>Net Appropriation</b>	<b>2,179,225</b>	<b>2,400,416</b>	<b>2,361,477</b>	<b>2,270,123</b>	<b>(91,354)</b>

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**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Procurement, Acquisition, and Construction  
**JUSTIFICATION OF CHANGES TO BASE**  
(Dollar Amounts in Thousands)

		FTE	Amount
<u>Adjustments:</u>			
Restoration of FY 2016 deobligations	13,000,000	1	13,000
<u>Financing:</u>			
In 2017, NOAA expects to realize recoveries of prior year obligations of \$13,000,000. This amount will be used to offset the budget authority in 2017.	(13,000,000)	0	(13,000)
<u>Transfers:</u>			
NESDIS transfer from PAC Geostationary – R PPA to ORF Satellite & Product Operations, NSOF Operations, Product, Development, Readiness, & Application, National Centers for Environmental Information PPAs.	0	0	(38,939)
NESDIS transfer from PAC Jason-3 PPA to ORF Satellite & Product Operations, Product, Development, Readiness, & Application, National Centers for Environmental Information PPAs.	0	0	(33,900,000)
NESDIS transfer from PAC DSCOVER PPA to ORF Satellite & Product Operations, National Centers for Environmental Information PPAs.	0	0	(2,931,000)
NESDIS transfer from PAC Satellite Ground Systems PPA to ORF Satellite & Product Operations PPA.	0	0	(908,000)
	0	0	(1,200,000)
	0	0	(38,939,000)
Total Adjustments to Base		1	(38,939)

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

Object Class	FY 2015 Actuals	FY 2016 Enacted	FY 2017 Base Program	FY 2017 Estimate	Increase / (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	35,255	37,249	37,249	37,435	186
11.3 Other than full-time permanent	81	86	86	86	0
11.5 Other personnel compensation	973	1,028	1,028	1,028	0
11.6 Leave Surcharge	2	2	2	2	0
11.7 Military personnel	298	315	315	315	0
11.9 Total Personnel Compensation	36,609	38,679	38,679	38,865	186
12 Civilian personnel benefits	10,795	11,405	11,405	11,461	56
13 Benefits for former personnel	1	1	1	1	0
21 Travel and transportation of persons	2,396	2,531	2,531	2,581	50
22 Transportation of things	107	113	113	398	285
23.1 Rental payments to GSA	5,787	2,756	2,756	2,756	0
23.2 Rental payments to others	8	8	8	8	0
23.3 Communications, utilities and miscellaneous charges	11,042	11,666	11,666	11,666	0
24 Printing and reproduction	298	315	315	315	0
25.1 Advisory and assistance services	60,808	64,247	64,247	61,053	(3,194)
25.2 Other services	195,449	209,860	209,860	239,018	29,158

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

Object Class	FY 2015 Actuals	FY 2016 Enacted	FY 2017 Base Program	FY 2017 Estimate	Increase / (Decrease)
25.3 Purchases of goods and services from Govt accounts	1,625,209	1,717,147	1,678,208	1,542,763	(135,445)
25.4 Operation and maintenance of facilities	0	0	0	0	0
25.5 Research and development contracts	25,969	27,438	27,438	27,438	0
26 Supplies and materials	38,069	40,222	40,222	40,222	0
31 Equipment	227,338	240,194	240,194	257,744	17,550
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	43,094	45,531	45,531	45,531	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	31	(0)	(0)	(0)	0
44 Refunds	0	0	0	0	0
99 Total Obligations	2,283,010	2,412,114	2,373,175	2,281,821	(91,354)

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

Object Class	FY 2015 Actuals	FY 2016 Enacted	FY 2017 Base Program	FY 2017 Estimate	Increase / (Decrease)
Cash Refund/Prior Year Recoveries	(3,326)	0	0	0	0
Deobligations	(4,963)	(13,000)	(13,000)	(13,000)	0
Unobligated Balance, expiring	438	0	0	0	0
Unobligated Balance, Start of Year	(124,594)	0	0	0	0
Unobligated Balance, End of Year	59,864	0	0	0	0
Unobligated Balance, not apportioned	0	0	0	0	0
Less: Spectrum Relocation Fund Obligations	(4,684)	0	0	0	0
<b>Total Discretionary PAC Budget Authority</b>	<b>2,175,745</b>	<b>2,399,114</b>	<b>2,360,175</b>	<b>2,268,821</b>	<b>(91,354)</b>
Positions	277	346	346	348	2
FTE	277	342	343	345	2

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## **BUDGET PROGRAM: NATIONAL OCEAN SERVICE**

For FY 2017, NOAA requests a total of \$569,915,000 and 1,220 FTE for the National Ocean Service, including a net increase of \$33,152,000 and 3 FTE in program changes.

### **National Ocean Service Overview**

The National Ocean Service (NOS) enables safe, sustainable, and efficient use of marine and coastal resources. As marine resources face increasing threats, NOS's science-based products and services have become increasingly essential to the Nation's economic and ecological well-being. In addition to informing smart resource management and stewardship, NOS directly enables the safe and efficient operation of ocean-going economic activity including maritime commerce, offshore energy development, fishing, aquaculture, and tourism.

The last decennial Census counted 163.8 million people (over 50 percent of the United States population) living in coastal counties; this number is expected to increase by more than 15 million by 2020.<sup>1</sup> As population densities and economic activity increase, so do their negative externalities such as port congestion, navigation hazards, shoreline erosion, pollution, and other ill effects. These pressures combined with long-term environmental shifts make coastal resources management increasingly challenging.

NOS's data and services sustain lives and livelihoods, reduce risk, and facilitate adaptation to change. NOS's physical oceanographic activities – mapping, observations, and positioning – are essential to sustaining maritime commerce and managing and mitigating coastal threats. When oil spills, chemical releases, and marine debris damage coastal resources, NOS's scientific expertise is essential to emergency response and long-term recovery. NOS plays a leading role in place-based protection of the Nation's special marine areas: the National Marine Sanctuaries System, the National Estuarine Research Reserve System, and the National System of Marine Protected Areas. NOS also enables the sustainable use of resources through technical assistance, applied research, and partnership building.

The National Ocean Service is organized into three sub-programs within the Operations, Research, and Facilities (ORF) account (\$505,259,000 and 1,195 FTE):

- Navigation, Observations and Positioning (\$207,906,000 and 552 FTE) includes NOAA's physical oceanographic activities conducted under the Coast and Geodetic Survey Act, Hydrographic Services Improvement Act, Integrated Coastal and Ocean Observation System Act, and Ocean and Coastal Mapping Integration Act.
- Coastal Science and Assessment (\$83,112,000 and 297 FTE) includes research, response, assessment, and monitoring programs conducted under the Harmful Algal Bloom and Hypoxia Research and Control Act; National Coastal Monitoring Act; Marine Debris Act; Oceans and Human Health Act; Oil Pollution Act; and Comprehensive Environmental Response, Compensation, and Liability Act.
- Ocean and Coastal Management and Services (\$214,241,000 and 346 FTE) includes NOAA programs conducted under the Coastal Zone Management Act, National Marine Sanctuaries Act, Executive Order 13158 (Marine Protected Areas) and Coral Reef Conservation Act.

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<sup>1</sup> *National Coastal Population Report*, <http://stateofthecoast.noaa.gov>

NOS Procurement, Acquisition, and Construction (PAC) activities (\$3,700,000 and 5 FTE) include the National Estuarine Research Reserve System (NERRS) Construction and Land Acquisition Program and the National Marine Sanctuaries Construction Program.

NOS manages four other accounts:

- NOAA Damage Assessment and Restoration Revolving Fund
- Sanctuaries Enforcement Asset Forfeiture Fund
- Gulf Coast Ecosystem Restoration Science, Observation, Monitoring & Technology Fund
- National Oceans and Coastal Security Fund

**Significant Inflationary Adjustments:**

NOAA’s FY 2017 Base includes an increase of \$4,519,000 and 0 FTE to account for the full funding requirement for inflationary adjustments to current programs for NOS activities. This includes the estimated 2017 Federal pay raise of 1.6 percent as well as inflationary increases for non-labor activities including service contracts, utilities, field office lease payments, and rent charges from the General Services Administration (GSA).

NOAA also requests the following transfers for a net change of \$0 and 0 FTE to the agency:

From Office	PPA	To Office	PPA	Amount / FTE
MS	Mission Services and Management	NOS	Navigation, Observations and Positioning	\$214,000 / 0 FTE
MS	Mission Services and Management	NOS	Coastal Science, Assessment, Response and Restoration	\$422,000/ 0 FTE
MS	Mission Services and Management	NOS	Coral Reef Program	\$4,000/ 0 FTE

NOAA requests to transfer \$22,000 and 0 FTE to move funding for operations at the David Skaggs Research Center in Boulder, CO from the Mission Support Facilities to NOS. This funding is currently appropriated to the Mission Services and Management PPA and then distributed to the Line and Staff Offices annually. This reallocation will increase efficiencies by eliminating the need for funding transfers subsequent to appropriation and will improve transparency.

NOAA requests to transfer \$618,000 and 0 FTE to move funding associated with NOAA’s Western Regional Center (WRC) management activities from Mission Support Facilities to NOS. Currently, costs for these activities are paid directly through the funding appropriated to the Mission Services and Management PPA. This reallocation supports NOAA’s plan to employ an integrated campus cost model to allocate the cost of services provided to the WRC tenants. The tenants will then be billed directly based on the approved cost model. An integrated cost model will provide greater transparency and a more accurate reflection of program operating costs.

**APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES**  
**SUB-PROGRAM: NAVIGATION, OBSERVATIONS AND POSITIONING**

NOAA carries out the Navigation, Observations and Positioning (NOP) sub-program under the Coast and Geodetic Survey Act, the Hydrographic Services Improvement Act, the Integrated Coastal and Ocean Observation System Act, and the Ocean and Coastal Mapping Integration Act. NOP produces an integrated suite of physical oceanographic data and applications that enable safe, efficient, and sustainable uses of coastal areas and waterways. In addition, NOP provides actionable environmental intelligence – storm surge forecasting, ecological forecasting, habitat restoration, and coastal ocean science and oil spill response – to build community resilience. Global positioning and geodetic referencing provide the foundational data layer that ensures accuracy of all mapping and coastal environmental observations.

The following offices comprise the Navigation, Observation, and Positioning sub-program:

- **Office of Coast Survey (OCS):** The Office of Coast Survey, America’s oldest scientific agency, is responsible for surveying and charting the Nation’s waters. The OCS director serves as the Nation’s Hydrographer and represents the United States in the International Hydrographic Organization, which sets standards for surveying and charting and builds hydrographic capacity in other nations for safe global navigation.
- **National Geodetic Survey (NGS):** The National Geodetic Survey provides the authoritative framework and standards for positioning, geospatial data, and related applications. NGS data and tools support a wide range of activities including mapping, navigation, flood risk determination, transportation, land use, and ecosystem management. As part of its leadership role in the positioning sector, NGS develops industry guidelines, specifications, and standards and provides training for surveyors.
- **Center for Operational Oceanographic Products and Services (CO-OPS):** CO-OPS produces critical oceanographic observations and forecasts related to tides, currents, and water levels.
- **Integrated Ocean Observing System (IOOS):** NOAA leads the implementation and administration of a vast network of Federal and non-Federal observing systems that fulfill regional, national, and global needs. U.S. IOOS represents a partnership of 17 Federal agencies and 11 regional associations.

**Navigation, Observations and Positioning**

*Navigation Charts and Services*

NOAA surveys and charts the 3.4 million square nautical miles of waters in the U.S. Exclusive Economic Zone (EEZ). Commercial shippers, fishers, the Navy, the Coast Guard, state and local governments, recreational boaters, and many others rely on the reference infrastructure and nautical charts produced by this program. NOAA also continually improves hydrography and charting efforts through ongoing research and development.

In 2015, NOAA supported industry to deploy new tools that provide mariners with comprehensive, intuitive, and accessible situational awareness. NOAA provided data from high resolution hydrographic surveys, wave buoys, water levels, and a new Nearshore Wave Prediction System (NWPS) to support development of an under keel clearance system that portrays real-time and forecasted depths. The project, piloted in the ports of Los Angeles and Long Beach, CA, will serve as a model for safe navigation of deep-draft ships into other busy ports.

Mapping data provide the foundation for coastal zone and emergency management, climate assessments, and coastal research. Through its leading role in the interagency Integrated Ocean and Coastal Mapping (IOCM) initiative, NOAA coordinates acquisition, management, and processing of ocean and coastal mapping data from multiple sources to leverage investments and maximize use and re-use.

The following activities comprise NOAA's integrated suite of charting and navigation products and services:

- **Hydrographic Surveys.** NOAA acquires hydrographic data through its hydrographic fleet and contract surveyors. These surveys, primarily in the 511,000 square nautical miles of navigationally significant U.S. waters, provide depth and hazardous obstruction data for nautical charts and other applications such as water modeling, fisheries management, and coastal planning. Surveys using NOAA platforms and NOAA personnel are essential to maintain the necessary technical expertise to oversee contracts, quality control data, develop survey technologies, and coordinate with the International Hydrographic Organization and other nations.
- **Water Level Datums.** Observations from the National Water Level Observation Network (NWLON) provide the framework for the national tidal datum network, used for navigation, positioning, and shoreline boundary definition. These observations also provide accurate tidal and water level data to the public and are critical to nautical chart products, hydrographic and shoreline surveys, and marine boundary definition.
- **Tide and Tidal Current Predictions.** NOAA maintains and updates official tide and current prediction tables using real-time observations, meteorological forecasts, and astronomical predictions to produce forecasts and "nowcasts" (modeled data on maritime conditions where there are gaps in real-time observations) of tides and currents.
- **Marine Charts.** NOAA cartographers develop approximately 2,000 navigation products, including over 1,000 nautical charts, to ensure safe navigation through U.S. ports. NOAA cartographers share their technical expertise with the International Hydrographic Organization to develop international data and mapping standards.
- **Research and Development.** NOS continually advances cartographic, hydrographic, and oceanographic science, which underpin NOAA's mapping efforts. This R&D routinely leads to new survey technologies, software, models, and geospatial products and tools such as the National Vertical Datum Transformation tool (VDatum), autonomous underwater vehicles, and Ellipsoidally Referenced Surveys. NOAA's Joint Hydrographic Center (JHC) develops remote sensing technologies and processes to improve data acquisition, processing, and charting. The JHC also supports the delimitation of the U.S. Extended Continental Shelf and sovereign rights beyond 200 nautical miles.
- **Navigation Response Teams (NRTs) and Regional Services.** Navigation Response Teams conduct hydrographic surveys in inshore areas to develop charts and other products. NRTs also conduct rapid response surveys after maritime emergencies and natural disasters, thereby minimizing costly port closures and draft restrictions. NOAA engages with customers and stakeholders to improve NOAA's responsiveness to charting and navigation issues and increase the use of new charting technologies.
- **Coastal Mapping.** The Coastal Mapping Program (CMP) defines the Nation's 95,000-mile shoreline, the single largest data layer for nautical charts, and helps define U.S. maritime boundaries including the EEZ. NOAA maps the shoreline by producing tidally coordinated, geo-referenced data from aerial photographs, high-resolution satellite imagery, and aerial topographic-bathymetric (topo-bathy) LIDAR. The LIDAR data



enables the creation of digital elevation models that support coastal inundation modeling, floodplain mapping, benthic habitat mapping, and emergency response.

- **Physical Oceanographic Real-Time System (PORTS®).** PORTS® is a decision-support tool that integrates real-time environmental observations, nowcasts, and forecasts to facilitate safe marine navigation.

### *Positioning and Geodesy*

NOS's Geodesy program defines and maintains the National Spatial Reference System (NSRS), the common reference framework for all geospatial data: latitude, longitude, height, scale, gravity, and orientation. NOS conducts geodesy and height modernization activities throughout the U.S. The geodesy products provide the foundational data layer for transportation, mapping and charting, and other scientific and engineering applications.

A 2009 study estimated that the NSRS provides more than \$2.4 billion in potential annual benefits to the national economy.<sup>2</sup> The estimated economic benefits of the NOAA Continuously Operating Reference Station (CORS) network alone were \$758 million per year. The same study calculated that the Nation will realize an additional \$522 million in annual economic benefits by fully implementing a new geoid-based vertical reference system through the Gravity for the Re-Definition of the American Vertical Datum (GRAV-D) initiative, with approximately \$240 million saved from improved floodplain management alone.

The NOAA Geodesy program continually improves the quality and accessibility of the NSRS by participating in the development of international geodetic policy, standards, and guidelines.

The NOAA Geodesy Program comprises five major overlapping elements:

- **Passive Network Infrastructure.** A major component of NSRS is a network of over one million permanently marked passive reference points that provide the foundation for all geospatially-referenced activities conducted in the United States.
- **Continuously Operating Reference Stations (CORS).** CORS are a publicly available network of permanent global positioning system (GPS) receivers that enable highly accurate positioning relative to the NSRS. NOS is working to establish a network of NOAA-owned CORS, which link the NSRS to the International Terrestrial Reference Frame (ITRF), to improve forecasts of global sea level rise and inform coastal infrastructure planning.
- **Modernization of the Vertical Datum.** NOS leads the Nation's efforts to enhance the vertical aspect of the NSRS through its Gravity for the Re-Definition of the American Vertical Datum (GRAV-D) initiative. GRAV-D is a long-term effort to collect gravity data and build the Nation's gravimetric geoid model. This initiative will ultimately lead to new, highly accurate national vertical datum, allowing GPS to establish more accurate elevations for all positioning needs. This system can help communities improve resilience by determining where water flows, allowing them to make accurate inundation models and assessments.
- **Data Access and Capacity Building.** NOS provides access to geodetic, shoreline, and aerial survey data, including data from partner organizations. As part of its technology

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<sup>2</sup> Socio-Economic Benefits Study: Scoping the Value of CORS and GRAV-D, Levenson 2009

transfer efforts NOS conducts workshops and hosts constituent forums around the country. NOS also runs the State Geodetic Advisor Program, a cost-shared program that assists 25 states' geodetic and surveying programs.

- **Research and Subject Matter Leadership.** NOS develops standards, guidelines, and best practices for the surveying and positioning industry as well as a variety of models of geophysical and atmospheric phenomena that affect spatial measurements. These tools are crucial to scientific and commercial positioning activities.

### *Ocean and Coastal Observations*

NOS's ocean and coastal observation programs are rooted in three authorizations. The Coast and Geodetic Survey Act authorizes water level observations, analyses, and predictions. The Hydrographic Services Improvement Act provides for the collection of real-time information and the use of information for coastal resource management. The Integrated Coastal and Ocean Observation System Act (ICOOS Act) charges NOAA with leading oversight and administration of regional observing systems. NOAA coordinates across Federal and non-Federal entities to maximize the Nation's return on investment in IOOS. Other relevant legislation includes the Tsunami Warning and Education Act, which directs the use of real-time tide data for tsunami warnings.

### *Tides and Currents Program*

Through its Tides and Currents Data Program, NOAA operates two primary observing systems that the maritime community relies upon for safe and efficient navigation: the National Water Level Observation Network (NWLON) and National Current Program. These two systems and partner data enable NOS to provide observations, nowcasts, and forecasts that commercial and other mariners need to navigate safely. Emergency response agencies use NOS's water level predictions and tidal current models for oil spill response.

- **Water Level Observations.** The NWLON consists of 210 long-term, continuously operating water level stations throughout the coastal U.S., the Great Lakes, and island possessions and territories. Information from the NWLON ranges from real-time, high frequency data (e.g., tsunami 1-minute data and storm surge) to long-term datasets (e.g., sea level and lake level trends). NWLON data forms the basis of the vertical reference framework for a variety of applications including marine boundaries, delineation of the national shoreline, and nautical charts. Additional applications of water level information include habitat restoration, emergency management, dredging, coastal planning and management, and construction projects.
- **Modeling and Forecasting.** Where sensors are not present or future data are needed, NOS's nowcast and forecast models provide information on short-term water level and other environmental variables. These forecasts are accurate out to 48 hours and enable informed decision-making, particularly for vessel transits. NOS currently operates 15 nowcast/forecast models. In FY 2015, NOS implemented significant infrastructure upgrades to models for Chesapeake Bay, Delaware Bay, and Tampa Bay that will improve performance by taking advantage of the improved high-performance computing infrastructure. In FY 2016, NOS is implementing a new model for Lake Erie, a new model for Cook Inlet, and a West Coast shelf model. Finally, NOS is developing a model for the Gulf of Maine in FY 2016 for deployment in FY 2017.
- **Physical Oceanographic Real Time Systems (PORTS®).** NOS and partners operate PORTS®, a decision-support tool that integrates and disseminates real-time information on water levels, currents, salinity and meteorological data (e.g., wind, atmospheric

pressure, visibility, and air and water temperatures) to mariners and other users. The 25 PORTS® systems in operation serve 61 of the busiest seaports in the Nation. In some locations, PORTS® includes sensors for visibility, waves, and bridge clearance. PORTS® is a cost-shared program; local partners (e.g., local port authorities, pilot associations, shippers, Department of Defense) provide funding for the sensor systems and ongoing maintenance. NOS provides technical expertise for systems design, 24/7 quality control, data management and dissemination infrastructure, and ongoing management of the data.

#### *Data Integration, Regional Support, and Sensor Development*

The Integrated Ocean Observing System IOOS program, led by NOAA, serves the dual functions of improving compatibility between Federal and regional observations and providing direct technical and funding support for regional observing systems. The vision of IOOS is a unified network of Federal and non-Federal observing assets that serve coastal industries and decision-makers. By improving the accessibility and interoperability of ocean data, IOOS enables users of ocean data (modelers, researchers, meteorologists, and others) to spend their resources more effectively improving and developing products. Observations by NOS assets and partners are critical components of the U.S. IOOS and the Global Earth Observation (GEO).

The IOOS Regional component is tailored to the economic and environmental requirements of local communities and complements Federal ocean observations and models. NOAA supports regional IOOS associations through cooperative agreements for operations and maintenance, capital projects, and new sensor research, development, testing, and evaluation. IOOS Regional Associations deploy observing assets in accordance with nationally coordinated build-out plans. Recent investments have focused on buoys, gliders, coastal high frequency (HF) radar, animal telemetry (data from electronic tags attached to marine animals) and models to support hurricane storm surge and inundation forecasting. These capabilities protect American lives and support American livelihoods by aiding resilience to climate change, ocean acidification, spills, extreme weather, and near-shore search-and-rescue requirements.

The U.S. IOOS Marine Sensor Innovation program is working to incorporate new marine sensor technologies and observing strategies into IOOS operations and other monitoring and prediction programs. Required coordination among the research community and IOOS regional associations will ensure that new technologies and data sources improve existing operational models and forecasts.

### **Schedule and Milestones:**

- Develop Automated Nautical Charting System II – one central database available for all formats of charts by FY 2020
- Progressively implement data archive capability for NOAA charter mapping data from University-National Oceanographic Laboratory System (UNOLS) projects (FY 2017-2021)
- Annually increase topo-bathy shoreline data collection and reach full production levels in FY 2020
- Partner with NOAA/OAR/Ocean Acidification Program to deploy and operate ocean acidification sensors on regional IOOS platforms (buoys, shore stations, gliders) (FY 2017-2021)
- Initiate competitively selected Marine Sensor Innovation demonstration projects and conduct technology demonstrations and evaluations in U.S. IOOS regions (FY 2017-2021)
- Transition demonstrated marine sensor tools and technologies into operations (on-going)

### **Deliverables:**

- A total of 1,100 Electronic Navigational Charts (ENCs) made available to public by FY 2018
- 175 new editions of Raster Navigational Charts maintained annually, increasing ten percent each year with a final goal of 250 per year
- Eight new editions of Coast Pilot published annually
- 120 hydrographic surveys (conducted by NOAA survey units, contractors, and other sources) that have been evaluated and approved for nautical charting and other uses (annual)
- Greater than 95 percent of water level data is made available to the public
- Six seasonal tide gauges installed per year in support of the International Great Lakes Datum update starting in FY 2017
- Release a gravity-based geoid based on GRAV-D data (FY 2022)
- GPS satellite orbit differential analysis to pinpoint the locations of more than 40 GPS and GNSS satellites to ensure the accuracy of satellite-delivered positioning information; serve as the International GNSS Service Analysis Center Coordinator
- “Quality Assurance of Real Time Oceanographic Data” (QARTOD) manuals issued for IOOS core variables including temperature, salinity, etc.
- IOOS enterprise metrics refined for assessing system performance and maturity
- High Frequency radar of system performance and operational readiness trend analysis
- Two or more emerging tools or technologies incorporated within two or more U.S. IOOS regions every three years

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Increase percent of charts loaded into Nautical Information System (NIS) under "ENC First" model of nautical chart production	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	35%	60%	80%	100%	100%	100%	100%
<b>Description:</b> "ENC First" is the way in which NOAA is transforming its chart production model, making ENCs the flagship charting product rather than raster or paper charts. NOAA is increasing the percent of charts loaded into the NIS in order to accomplish 100% of charts being produced under the "ENC First" model in time for the 2018 requirement of SOLAS-class vessels to have the latest ENC on the ship's bridge. NOAA will accomplish this goal while continuing to maintain and publish all existing chart products on a weekly basis for incoming navigational information.							

<b>Performance Measure:</b> Reduce the hydrographic survey backlog within navigationally significant areas (indicator 3.3h)*	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	3,135	2,509	2,953	2,953	2,953	2,953	2,953
<b>Description:</b> NOAA conducts hydrographic surveys to determine bathymetry primarily in U.S. waters significant for navigation. This activity includes the detection, location, and identification of wrecks and obstructions with side scan and multi-beam sonar technology. NOAA uses the data to produce nautical charts in a variety of formats.							

\* This number represents estimated annual survey area based on anticipated fleet DAS and contract survey funds.

<b>Performance Measure:</b> Update National Shoreline and Priority Ports (Percentage of total per year)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	6.5%/20%	5.5%/20%	5.7%/25%	6.0%/33%	6.6%/33%	6.6%/33%	6.6%/33%
<b>Description:</b> NOAA updates the official U.S. national shoreline data layer to provide a geographic reference that supports critical coastal activities ranging from marine planning to emergency response. The national shoreline is a key feature of nautical charts and must be updated periodically to reflect changes due to storms, flooding, sea level change, erosion, and subsidence. Priority ports (of which there are 175 that cover 95 percent of shipping cargo) must be updated more frequently because of their larger volume of maritime activity. This measure tracks the percent of the entire shoreline, as well as the percent of shoreline in priority ports, that is reviewed and confirmed correct or updated each year with in-house and contract assets.							

<b>Performance Measure:</b> Percent of U.S. and territories enabled to benefit from a new national vertical reference system for improved inundation management (indicator 3.3i)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	45%	53%	62%	70%	79%	87%	96%
<b>Description:</b> The NOAA National Geodetic Survey is working to complete the Gravity for the Redefinition of the American Vertical Datum (GRAV-D) initiative and implement a new National Vertical Datum. This reference system is critical for all observing systems and activities that require accurate heights. For example, the system can help communities improve their resilience by determining where water flows, which will allow them to make accurate inundation (i.e., flooding) models and assessments. For the measurement, an area is considered enabled when it has the GRAV-D data necessary to support the new National Vertical Datum. The total area used to calculate the percentage includes U.S. territorial land and adjacent land and water areas necessary for final determination of a national vertical reference system.							

<b>Performance Measure:</b> Update accuracy of NOAA tidal current predictions (number of locations)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	48	70	70	70	70	70	70
<b>Description:</b> The Coast and Geodetic Survey Act authorizes NOAA to conduct tide and current observations and to analyze and predict tide and current data and publish data, information, compilations, and reports including short-term tidal current surveys that are used to update the NOAA annual tidal current prediction tables. This measure tracks NOAA's progress in updating the accuracy of these predictions by tracking the number of locations that have been updated.							

**PROGRAM CHANGES FOR FY 2017:**

**Navigation, Observations and Positioning: Hydrographic Research and Technology**

**Development (Base Funding: \$8,964,000 and 0 FTE; Program Change: -\$2,000,000 and 0**

**FTE)**: NOAA requests a decrease of \$2,000,000 and 0 FTE for a total of \$6,964,000 and 0 FTE 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, Observation and Positioning programs.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Program:** National Ocean Service  
**Sub-program:** Navigation, Observations and Positioning  
**Program Change:** Hydrographic Research and Technology Development

Object Class	FY 2017 Decrease	FY 2017 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$62,035
11.3 Other than full-time permanent	0	352
11.5 Other personnel compensation	0	555
11.8 Special personnel services payments	0	1,279
11.9 Total personnel compensation	<u>0</u>	<u>64,221</u>
12 Civilian personnel benefits	0	18,260
13 Benefits for former personnel	0	60
21 Travel and transportation of persons	0	2,551
22 Transportation of things	0	130
23.1 Rental payments to GSA	0	4,584
23.2 Rental Payments to others	0	1,126
23.3 Communications, utilities and miscellaneous charges	0	1,702
24 Printing and reproduction	0	36
25.1 Advisory and assistance services	0	33,383
25.2 Other services	0	4,964
25.3 Purchases of goods & services from Gov't accounts	0	829
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	23
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	2,500
31 Equipment	0	3,500
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	(2,000)	11,536
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	1
99 Total obligations	<u>(2,000)</u>	<u>\$149,406</u>

\* Due to financial system limitations, the object class detail for the Program reflects the full Navigation, Observations, and Positioning PPA.



**Navigation, Observations and Positioning: Regional Geospatial Modeling Grants (Base Funding: \$6,000,000 and 0 FTE; Program Change: -\$6,000,000 and 0 FTE):** NOAA requests a decrease of \$6,000,000 and 0 FTE for a total of \$0 and 0 FTE to terminate the Regional Geospatial Modeling Grant program. NOAA will continue to support a range of other regional geospatial requirements through NOS's Coastal Zone Management and Services and Navigation, Observations and Positioning program activities. These regionally significant activities include height modernization, Continuously Operating Reference Stations (CORS), data access and capacity building.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Program:** National Ocean Service  
**Sub-program:** Navigation, Observations and Positioning  
**Program Change:** Regional Geospatial Modeling Grants

<b>Object Class</b>	<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$62,035
11.3 Other than full-time permanent	0	352
11.5 Other personnel compensation	0	555
11.8 Special personnel services payments	0	1,279
11.9 Total personnel compensation	0	64,221
12 Civilian personnel benefits	0	18,260
13 Benefits for former personnel	0	60
21 Travel and transportation of persons	0	2,551
22 Transportation of things	0	130
23.1 Rental payments to GSA	0	4,584
23.2 Rental Payments to others	0	1,126
23.3 Communications, utilities and miscellaneous charges	0	1,702
24 Printing and reproduction	0	36
25.1 Advisory and assistance services	0	33,383
25.2 Other services	0	4,964
25.3 Purchases of goods & services from Gov't accounts	0	829
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	23
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	2,500
31 Equipment	0	3,500
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	(6,000)	7,536
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	1
99 Total obligations	(6,000)	145,406

\* Due to financial system limitations, the object class detail for the Program reflects the full Navigation, Observations, and Positioning PPA.

**Hydrographic Survey Priorities/Contracts: Reduce Acquisition of Hydrographic Surveys Data (Base Funding: \$27,000,000 and 0 FTE; Program Change: -\$2,000,000 and 0 FTE):**

NOAA requests a decrease of \$2,000,000 and 0 FTE for a total of \$25,000,000 and 0 FTE to reduce acquisition of hydrographic data from contract surveys. NOAA will continue to acquire hydrographic data from contract surveyors with the remaining funds in support of navigation and other coastal intelligence needs.

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Reduce the hydrographic survey backlog within navigationally significant areas (indicator 3.3h)*	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Decrease</b>	N/A	N/A	2,462	2,462	2,462	2,462	2,462
<b>Without Decrease</b>	3,135	2,509	2,953	2,953	2,953	2,953	2,953
<b>Description:</b> NOAA conducts hydrographic surveys to determine bathymetry primarily in U.S. waters significant for navigation. This activity includes the detection, location, and identification of wrecks and obstructions with side scan and multi-beam sonar technology. NOAA uses the data to produce nautical charts in a variety of formats.							

\* This number represents estimated annual survey area based on anticipated fleet DAS and contract survey funds.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Program:** National Ocean Service  
**Sub-program:** Navigation, Observations and Positioning  
**Program Change:** Reduce Acquisition of Hydrographic Survey Data

<b>Object Class</b>	<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11 Personnel compensation		
11.1 Full-time permanent	(\$136)	\$1,035
11.3 Other than full-time permanent	0	0
11.5 Other personnel compensation	(2)	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	<u>(138)</u>	<u>\$1,035</u>
12 Civilian personnel benefits	(50)	393
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	(2)	0
22 Transportation of things	0	0
23.1 Rental payments to GSA	(23)	0
23.2 Rental Payments to others	0	161
23.3 Communications, utilities and miscellaneous charges	0	0
24 Printing and reproduction	0	0
25.1 Advisory and assistance services	(69)	161
25.2 Other services	(1,713)	23,250
25.3 Purchases of goods & services from Gov't accounts	0	0
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	0
31 Equipment	(1)	0
32 Lands and structures	(2)	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	(2)	0
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	<u>(2,000)</u>	<u>25,000</u>

## **APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES**

### **SUB-PROGRAM: COASTAL SCIENCE AND ASSESSMENT**

Under the Coastal Science and Assessment sub-program, NOAA conducts research for sustainable management, protection, and restoration of ocean and coastal resources. NOS focuses these research capabilities on monitoring, predicting and mitigating coastal ecosystem changes that have significant implications for the Nation's economic well-being. Burgeoning coastal development and increasing climate variability exacerbate stressors on coastal ecosystem services. NOS research and advisory services enable Federal, state, local, and private industry actions to mitigate the cumulative effects of these stressors and enhance resilience.

NOS implements the activities of this sub-program under the Clean Water Act; Oil Pollution Act; Comprehensive Environmental Response, Compensation, and Liability Act; National Coastal Monitoring Act; Marine Debris Act; and Harmful Algal Bloom and Hypoxia Research and Control Act. The research from this sub-program also helps to inform NOAA's activities under the National Marine Sanctuaries Act, Coastal Zone Management Act, and international treaties and conventions. NOAA's Ecological Forecasting Roadmap guides the transition of research to operational ecological forecasts, particularly in the areas of harmful algal blooms (HABs), hypoxia, and pathogens.

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

- **National Centers for Coastal Ocean Science (NCCOS).** NCCOS conducts applied research, monitoring, and assessments to build the scientific foundation for coastal management and resilient coastal ecosystems. NCCOS's capabilities are leveraged and enhanced by partnerships with resource managers nationwide. Current NCCOS focus areas include HABs, marine planning, and ecological effects of climate change and pollution. The program's ongoing engagement with stakeholders ensures that its research activities align with national, regional, and local science priorities. NCCOS centers are located in Maryland, South Carolina, North Carolina, and Alaska.
- **Office of Response and Restoration (OR&R).** OR&R is a center of expertise in preparing for and responding to threats to coastal environments from oil and chemical spills, releases from hazardous waste sites, and marine debris. When oil or hazardous substances threaten or injure coastal and marine resources, OR&R is responsible for assessing damage to natural resources and ensuring that cleanup actions protect those resources from further injury. NOAA responds to over 100 significant oil or chemical spills each year as scientific advisors to the Coast Guard.

### **Coastal Science, Assessment, Response and Restoration**

#### *Coastal Science and Monitoring*

NOS conducts applied research, monitoring, and assessments to build the scientific foundation for the protection and sustainable use of coastal resources. NOS advances these science priorities both through its laboratories and through grants for competitive, peer-reviewed, interdisciplinary research investigations. This combination of intramural and extramural research most effectively addresses research questions of diverse scopes and times scales.

NOS's applied science program seeks to understand the physical, biological, and social implications of resource management strategies and ecosystem stressors. A major focus area is

response to and recovery from hazards such as contaminants (including oil, hazardous chemicals, microplastics, and nanoparticles) and natural toxins such as those produced by harmful algal blooms. Studies to inform coastal ecosystem management activities include modeling of climate change impacts on biological communities; ecosystem characterizations and forecasts; and connections among coastal uses and stressors.

NOS intramural research programs also conduct long-term monitoring and maintain datasets that are essential to assessing the sensitivity of coastal ecosystems to stressors. When natural resource damage occurs, these data establish a baseline of ecosystem conditions that existed before the pollution event for assessing the extent of damages. The research in these areas enables NOS to develop resource protection strategies for NOAA-supported marine protected areas (including NERRs and sanctuaries).

NCCOS grantees and collaborators conduct multi-disciplinary studies on scientific questions for which the primary expertise often exists outside the government. The Competitive Research program executes these three- to five-year studies through cooperative agreements that bring together expertise from academic institutions, companies, and government laboratories.

#### *Emergency Response and Restoration of NOAA Trust Resources*

Federal, state, and local agencies across the country depend on NOAA's science-based guidance and training to minimize environmental and economic impacts of oil and chemical spills, vessel groundings, hazardous waste releases, and national security events. NOS also addresses persistent coastal hazards such as marine debris. NOS emergency services include oil spill trajectory modeling, shoreline cleanup assessment, identification of sensitive resources, and information management. NOS continues to provide critical scientific support for the recovery efforts from the Deepwater Horizon oil spill in the Gulf of Mexico.

After the initial response to a pollution event or grounding, NOS and other natural resource trustees are responsible for determining the extent of damages to natural resources and seek compensation on behalf of the public for the loss of ecosystem services. NOS also ensures that cleanup actions protect resources from further damage. NOS's Assessment and Restoration Program is a leader within the natural resource damage assessment community. To date, the program and its Federal and state partners have generated over \$500 million of restoration resources from responsible parties. Along with assessment work, NOS and the NOAA's Restoration Center are assisting affected communities with estuary habitat restoration.

NOS, through the Marine Debris Program, has a leading role in addressing marine debris affecting the ocean and coastal environment and navigation safety in the United States. The program scope comprises reduction, prevention, research, monitoring, and some removal activity. NOAA chairs the Federal Interagency Marine Debris Coordinating Committee and leads the Federal community on marine debris issues.

This program provides funding for extramural research grants in support of NOS's Coastal Science, Assessment, Response and Restoration program. See the program description for Coastal Science, Assessment, Response and Restoration for more information.

### **Schedule and Milestones:**

- Develop and enhance sea level rise modeling systems for the northern Gulf of Mexico and other priority regions to inform coastal planning, restoration, and protection of economic interests in the face of long-term sea level rise (FY 2017)
- Develop concept of operations for scenario-based hypoxia forecasts (FY 2017)
- Complete development of test kits for key HAB species and transition detection and monitoring technologies into forecasting systems and state monitoring (FY 2017)
- Develop new program component to the Ecological Effects of Sea Level Rise (EESLR) program that includes research and development of integrated geophysical and socioeconomic tools for resilience planning. (Program component developed in FY 2017; EESLR competition in FY 2018; awards issued from FY 2019 – 2021)
- Collect observations necessary to develop and improve forecasts (e.g. ship-based observing for seasonal forecasts and additional salinity measurements for improved hydrodynamic models) (FY 2017-2018)
- Support RESTORE Act Science Program through competitive research grants and other means of financial assistance (FY 2017 – 2019)
- Develop Marine Debris Rapid Response Plans with partners in the Gulf of Mexico, the southeast, and the northeast, as outlined in the Marine Debris Act 2012 reauthorization (FY 2017-2021)
- Conduct or participate in three joint and international oil spill pollution trainings/exercises per year by FY 2017
- Conduct or participate in two regional response exercises per quarter with NOAA presence (Federal, state, local, private)

**Deliverables:**

- Baseline ecological assessments in the Gulf of Mexico, Chesapeake Bay and select sanctuaries and NERRs
- Multidisciplinary ecological model to evaluate marsh, oyster, and sea grass response to sea level rise in selected locations of the Gulf of Mexico
- Develop a pilot GIS-based modular data integration framework for ecological forecasting
- Operational seasonal hypoxia forecast for the Gulf of Mexico
- Validated pathogen forecasts in the Chesapeake Bay
- Coupled regional biophysical model for understanding population connectivity between Pulley Ridge and Florida Keys ecosystems
- Newly developed sea level rise predictive models, visualization tools, and socioeconomic models used by managers to evaluate natural and nature-based infrastructure strategies for maximizing coastal resilience in 2-3 coastal regions (FY 2020)
- Seasonal and weekly HAB and hypoxia forecasts for Pacific Northwest outer coast and Puget Sound disseminated to management, and system is evaluated by the Ecological Forecast Roadmap for possible operationalization (FY 2020)
- Fund up to five research projects annually that address marine debris research and development priorities
- Improved spill trajectory models for Beaufort/Chukchi Seas (FY 2018-2019)
- Updated Arctic operational oceanographic and oil fate and behavior models to include oil-in-ice behavior to support oil spill response
- Update Environmental Sensitivity Index (ESI) Maps for the NW Arctic, North Slope (FY 2017-2018)



**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Annual number of coastal, marine, and Great Lakes ecosystem sites adequately characterized for management (indicator 3.3c)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	21	10	10	10	10	10	10

**Description:** This measure tracks the number of ecosystem characterizations developed for use by NOAA and its partners, which include Federal, state, local, regional, territorial, and other entities. Ecological characterizations provide the scientific basis for most management and regulatory decisions concerning coastal and ocean resources. They also form the foundation for plans to manage those resources and are how NOAA assesses the effectiveness of management measures once they are implemented. Ecological characterizations inform management decisions such as those pertaining to the following:

- 1) Sites proposed for designation as National Marine Sanctuaries, National Estuarine Research Reserves, National Marine Parks, and Marine National Monuments, or the proposed expansion of such existing sites;
- 2) The location of offshore development such as wind farms, aquaculture operations, and the routing of undersea cables to minimize adverse environmental effects while supporting new industry development;
- 3) Designation of habitat areas of particular concern, essential fish habitat, and critical habitats under various statutes to support sustainable fisheries and recovery of protected species;
- 4) The management of marine resources including those managed by states and territories that request Federal technical assistance to meet their locally-defined development and conservation objectives; and
- 5) Remediation and restoration of coastal and marine resources that have been adversely impacted by chronic and acute pollution, habitat destruction, or other human-induced disturbances.

Ecological characterizations usually require several years to develop. FY 2015 represents the final year of several multi-year external research grants that were awarded starting in FY 2011 at a higher level of appropriations.

<b>Performance Measure:</b> Cumulative number of coastal, marine and Great Lakes forecast capabilities developed and used for management (indicator 3.3d) (NCCOS contribution only)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	7	8	10	14	17	18	18

**Description:** NOAA's discrete forecast models allow resource managers to;

- 1) Make decisions based on predicted environmental and socioeconomic impacts related to a particular issue;
- 2) Use forecasts to predict the impacts of a single ecosystem stressor (e.g., climate change, extreme natural events, pollution, invasive species, and land and resource use); and
- 3) Evaluate the potential options to manage those stressors to fulfill the ultimate goal for resource managers to use NOAA's forecasts to better manage ecosystem use, condition, and productivity.

The primary target for and the utility of each forecast varies. For instance, Gulf of Mexico harmful algal bloom (HAB) forecasts are targeted at recreational beach visitors to minimize human health impacts from swimming or sun bathing near high-impact areas. The Gulf of Maine HAB forecast is used by commercial fishermen and regulatory agencies to determine whether shellfish can be safely harvested and marketed to consumers. The Lake Erie HAB forecast is targeted to municipal drinking water suppliers such as in Toledo, Ohio, that adapt their operations to ensure public drinking water supplies remain safe and to alert recreational boaters.

These forecasts will be based on field and laboratory studies, existing data, and models predicting environmental conditions under different scenarios and will have capabilities specific to a geographic area and be counted for each ecosystem as they become operational. For example, HAB forecasts in the Gulf of Mexico and Gulf of Maine are two separate capabilities; however, multiple, distinct forecast capabilities could be counted within a single ecosystem (i.e., harmful algal blooms, and hypoxia –all in the Gulf of Mexico).

<b>Performance Measure:</b> Percent of all coastal communities susceptible to harmful algal blooms verifying use of accurate HAB forecasts (indicator 3.3j)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	18%	18%	18%	18%	18%	18%	18%

**Description:** This measure tracks the communities (currently using operational HAB forecasts) within a coastal region vulnerable to HABs and the utility and accuracy of those forecasts. Utility and accuracy are verified through customer feedback before and after a forecasted HAB event. This measure informs on-going NOAA efforts to characterize causes of HABs and their impacts to humans and coastal ecosystems, develop products that detect and forecast HAB species and toxins, and collaborate with stakeholders to develop HAB mitigation strategies. NCCOS, CO-OPS, and partners are developing operational forecasts to meet the needs of all vulnerable communities throughout the coastal U.S.

<b>Performance Measure:</b> Number of responders (Federal, state, local) trained in technical and scientific elements of incident response (SCAT, SOS, ERMA, CAMEO, etc.)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	2,682	2,000	2,000	2,000	2,000	2,000	2,000

**Description:** To protect coastal communities and ecosystems following oil and chemical spills and other incidents, emergency responders need technical expertise and an understanding of the relevant science. This measure tracks the number of emergency responders trained by OR&R in science of oil, chemical, and all hazards response. These trainings provide responders, including Federal, state, and local personnel, with tools and knowledge to make science-based decisions when pollution threatens our coasts and waterways.

<b>Performance Measure:</b> Metric tons of marine debris removed annually	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	1,267	400	400	400	400	400	400

**Description:** Marine debris is a global issue with impacts including wildlife injury and death from entanglement or ingestion, exposure to toxic chemicals, vessel damage, economics loss, and habitat destruction. This measure reflects the metric tons of marine debris removed from coastal areas as a direct result of NOAA funding. NOAA's overall impact on marine debris is even greater than this number indicates. The Marine Debris Program's prevention, research, and emergency planning support also help reduce the impacts of debris across the country.

## **PROGRAM CHANGES FOR FY 2017:**

**Competitive Research: Competitive Research (Base Funding: \$9,000,000 and 3 FTE; Program Change: +\$4,000,000 and 0 FTE):** NOAA requests an increase of \$4,000,000 and 0 FTE for a total of \$13,000,000 and 3 FTE to expand competitive research grants that address coastal ocean issues across NOAA's mission responsibilities including harmful algal blooms, hypoxia, and coastal ecosystem research and assessment.

### **Proposed Actions:**

With this increase, NOAA will expand and accelerate its competitive research grants program to improve and deliver ecological predictions, best management practices, and spatial planning tools to coastal communities. This program addresses accelerating threats of harmful algal blooms (HABs), hypoxia, coastal erosion, and changes in sea level and land use. Findings and tools from this research positions coastal managers and planners to better understand, predict, and mitigate the effects of environmental stressors on their communities, ecosystems, and economies. For example, improved solutions for shoreline protection and stabilization will bolster community resilience to storms and nuisance flooding. NCCOS supports competitive, peer-reviewed, interdisciplinary research investigations.

### **Statement of Need and Economic Benefits:**

Harmful algal blooms, hypoxia, climate change, and other ecosystem stressors negatively affect human health, impair coastal ecosystems, and can severely limit economic activity. In 2014, a HAB forced a three-day shutdown of the water treatment facility for Toledo, Ohio. In 2015, HABs across the country set records for their extent, duration, severity, and impact. In Lake Erie, HABs threatened \$1.4 billion in fishing and recreation. HABs also caused fish kills and severe respiratory distress in beachgoers in the Gulf of Mexico. Toxins in shellfish forced California, Washington, Oregon, Alaska, and the Gulf states to close shellfish harvesting to protect public health. The year 2015 also saw record flooding and coastal erosion events as coastal communities experienced frequent and severe storms.

These economic and resource impacts are increasing dramatically in many areas, therefore increasing the demand for relevant, comprehensive, and actionable science. Competitively funded research and applied science provides the information and tools coastal managers need to combat and mitigate the accelerating decline of the ecosystems and living resources under their purview. Funded activities will support NOAA's program authorizations including the Harmful Algal Bloom and Hypoxia Research and Control Act, the Coastal Zone Management Act, and the National Coastal Monitoring Act and will respond to Administrative ocean and coastal policy priorities including in the Great Lakes and Chesapeake Bay.

### **Resource Assessment:**

Efforts funded by Competitive Research grants are advancing understanding of ecosystem stressors, but the scale of the program has not kept pace with the increasing incidence and severity of threats associated with climate change and increasing coastal economic activity. The program has made key advances: the development of tools to incorporate the ecological effects of sea level rise and hardened shorelines into planning scenarios; the development and transition to application of an advanced HAB forecasting system; HAB detection tools that are protecting public safety and allowing harvesting of economically valuable shellfisheries; the capability to predict hypoxia and its impacts in the Nation's most important water bodies; and tools allowing managers to evaluate the trade-offs and linkages between watershed development and impacts to coastal ecosystems. Additional resources would allow for much-needed increases in breadth and scope of these types of research efforts.

## **Schedule and Milestones:**

Address emerging challenges in coastal resilience:

- Evaluate natural infrastructure for effectiveness in erosion control, wave attenuation, and provided ecosystem services (FY 2017 - 2020)
- Expand the Ecological Effects of Sea Level Rise (EESLR) program competition by competitively awarding regional research proposals that advance application of sea level rise and coastal flooding forecast tools to increase coastal resilience (FY 2017 – 2020)
- Develop new program component to EESLR to expand research and development of integrated bio-geophysical and socioeconomic tools to assess and promote coastal resilience in response to coastal flooding and sea level rise (FY 2017 – 2020)

Address emerging challenges from HABHRCA

- Develop new regional “Management Application” component to FY 2017 HAB Prevention, Control, and Mitigation (PCMHAB) competition aimed to ensure management application of HAB predictive tools (FY 2017 – 2020)
- Develop new program to assess the socioeconomic impacts of HABs and hypoxia to coastal communities on a regional scale (FY 2017 – 2021)
- Develop new regional “Management Application” component to Coastal Hypoxia Research Program competition aimed to ensure management application of hypoxia predictive tools (FY 2017 – 2023)

## **Deliverables:**

- Advanced models, visualization tools, and socioeconomic models used by managers to evaluate the interaction of sea level rise, coastal flooding, and natural and nature-based mitigation strategies in 2-3 coastal regions (FY 2020)
- Weekly and seasonal HAB and hypoxia forecasts for Pacific Northwest outer coast and Puget Sound disseminated to management and system evaluation by the Ecological Forecast Roadmap for possible operationalization (FY 2020)
- Management application of HAB ecosystem predictive models in two or more new regions per year and hypoxia models in two or more new regions per year (FY 2018 – 2020)
- Actionable and user friendly social and economic modeling tools developed to assess effects of HABs in two or more regions and hypoxia in two or more regions (FY 2020)

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Cumulative number of coastal, marine and Great lakes forecasts capabilities developed and used for management (indicator 3.3d) (NCCOS contribution only)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	7	12	14	16	18
<b>Without Increase</b>	6	7	7	8	8	8	8
<p><b>Description:</b> NOAA’s discrete forecast models allow resource managers to 1) make decisions based on predicted environmental and socioeconomic impacts related to a particular issue; 2) use issue-based forecasts to predict the impacts of a single ecosystem stressor (e.g., climate change, extreme natural events, pollution, invasive species, and land and resource use) and, 3) evaluate the potential options to manage those stressors to fulfill the ultimate goal for resource managers to use NOAA’s forecasts to better manage ecosystem use, condition, and productivity. These forecasts will be based on field and laboratory studies, existing data, and models predicting environmental conditions under different scenarios and will have capabilities specific to a geographic area and be counted for each ecosystem as they become operational. For example, harmful algal bloom forecasts in the Gulf of Mexico and Gulf of Maine are two separate forecast capabilities and similarly, multiple, distinct forecast capabilities could be counted within a single ecosystem (e.g., harmful algal blooms, pink shrimp harvest, and hypoxia—all in the Gulf of Mexico).</p>							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Program:** National Ocean Service  
**Sub-program:** Coastal Science and Assessment  
**Program Change:** NCCOS Competitive Research

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$250
11.3	Other than full-time permanent	0	9
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	259
12	Civilian personnel benefits	0	76
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	10
22	Transportation of things	0	1
23.1	Rental payments to GSA	0	45
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	10
24	Printing and reproduction	0	1
25.1	Advisory and assistance services	0	8
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	240
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	1
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	30
31	Equipment	0	168
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	4,000	12,151
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	\$ 4,000	\$13,000

**APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES**  
**SUB-PROGRAM: OCEAN AND COASTAL MANAGEMENT AND SERVICES**

Activities and programs under the Ocean and Coastal Management and Services sub-program use place-based, community, and regional approaches to achieve sound management and sustainable use of coastal and marine resources. These approaches emphasize collaboration across governments and sectors for capacity building, applied science, regulation, and direct management. NOAA conducts these activities under the Coastal Zone Management Act; the National Marine Sanctuaries Act; the Coastal Zone Act Reauthorization Amendments of 1990 (the Coastal Nonpoint Pollution Control Program); the Department of Commerce, Justice, and State Appropriations Act of 2002; the Omnibus Public Land Management Act; the Ocean Thermal Energy Conversion Act and the Deep Seabed Hard Mineral Resources Act; the Ocean and Coastal Mapping Integration Act; Executive Order 13158 on Marine Protected Areas; and Presidential Proclamations 8031 and 8337.

In FY 2015, Cordell Bank and the Gulf of the Farallones National Marine Sanctuaries in California expanded by 2,770 square miles based on public comment and research. The area now supports a wide variety of sea life including whales, seals, and white sharks and the food web upon which they depend in one of the Nation's most productive ocean areas. New research opportunities in the expansion areas have provided new findings including the discovery of large catshark and skate nursery areas and a new species of gorgonian coral.

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

- **Office for Coastal Management (OCM).** OCM supports implementation of states' Coastal Zone Management programs and National Estuarine Research Reserve management plans. This support includes policy guidance, technical assistance and training resources. The office also administers and supports the Coral Reef Conservation Program, NOAA's Digital Coast Partnership, regional partnerships alliances of coastal states, and the Ocean Thermal Energy Conversion Act and the Deep Seabed Hard Mineral Resources Act.
- **Office of National Marine Sanctuaries/National Marine Protected Areas Center.** This program office is responsible for the stewardship and management of the National Marine Sanctuary System, which is composed of 13 sanctuaries and the Papahānaumokuākea Marine National Monument. The office is also responsible for developing and coordinating a national system of marine protected areas to advance national conservation goals and to identify additional areas in need of protection.



## **Coastal Zone Management and Services**

While NOAA and other Federal agencies possess significant science and data capabilities to support coastal resource management, most decisions that affect the resilience of coastal communities occur at state and local levels. Voluntary partnerships between NOAA and coastal and Great Lakes states form the basis of NOS's approach under the Coastal Zone Management Act (CZMA). NOAA provides financial assistance, policy guidance, regional coordination, technical assistance, and other support to implement 34 state coastal zone management programs. NOS also assesses the performance of each state program approximately every five years, measuring the progress of individual state programs and the national program toward their respective goals. The CZMA also authorizes NOAA to support research, monitoring, education, training and stewardship at 28 National Estuarine Research Reserves.

The Coastal Zone Management (CZM) program helps states balance competing demands of resource use, economic development and conservation along the Nation's coasts. The 34 (out of 35 eligible) state-led coastal management programs protect more than 61,000 miles of ocean and Great Lakes coastline and cover 99 percent of the coastal population. In 2015, more than 10,000 acres of coastal lands were acquired or designated for long-term protection through the CZM program.

### *Coastal Zone Management Grants*

NOS supplements its support to CZM states with financial assistance in the form of Coastal Zone Management Grants. States may spend these funds on a broad range of approved activities under the CZMA, including coastal planning and permitting, habitat conservation and restoration, protection of life and property from coastal hazards, public access to the coast for recreation, and urban waterfront and port revitalization. NOS allocates the majority of CZM Grant funding using a formula based on shoreline mileage (60 percent) and coastal population (40 percent) of each state. NOS also competitively awards a portion of the Coastal Zone Enhancement funding (Section 309 CZMA) for projects of special merit. States match most of the CZM Grants on a 1:1 basis.

### *Regional Coastal Resilience Grants*

The Regional Coastal Resilience Grants program builds coastal communities' and ecosystems' preparedness for, recovery from, and adaptation to extreme weather, climate hazards, coastal inundation, and changing ocean conditions. The program funds regional collaborations of states, tribes, local governments, and public/private partnerships to address shared risks and vulnerabilities. Program priorities include 1) improved access to and understanding of information regarding current and future environmental, economic, and social conditions; 2) enhanced capacity to incorporate this information into decision making; and 3) implementation of projects and actions at the regional or community level. In FY 2015, NOAA evaluated 196 resilience proposals (between NOS and NMFS) totaling \$151 million; the number and scope of the proposals illustrate the urgent need for resilience efforts.

## **Coral Reef Program**

NOAA's Coral Reef Conservation Program brings together multidisciplinary expertise from over 30 NOAA offices to conserve and restore coral reefs. The program has partnerships with state, jurisdictional and international coastal resource managers. Coral reefs are among the most biologically diverse ecosystems in the world, providing a range of economic benefits and vital ecosystem services: food, recreation, marine habitat, medicines, coastal protection, climate

regulation, and biodiversity. A study in 2009 estimated the average annual value of these ecosystem services at \$130,000 per hectare of reef, reaching \$1,200,000 in some cases.<sup>3</sup> Declines in coral reefs – 19 percent of the world’s reefs are effectively lost and up to 75 percent are seriously threatened – have dire consequences for approximately 500 million people who depend on them for their livelihoods.<sup>4</sup>

The Coral Program integrates coral protection efforts across NOAA and other agencies to address overfishing, harmful fishing practices, climate change effects and land-based sources of pollution<sup>5</sup>, and other threats. The program’s approaches include ecosystem-based management initiatives to build marine protected area (MPA) management capacity; monitoring and forecasting of climate-related threats to coral reefs; and partnerships to address and reduce impacts of land-based sources of pollution. To date, NOAA and more than 300 partner agencies and organizations have mapped 12,100 km<sup>2</sup> (over 50 percent) of shallow reef ecosystems in U.S. jurisdictions, established approximately 200 operational and experimental coral bleaching alert stations, and developed watershed management plans in over 85 percent of jurisdictions with coral reef habitats. In addition, the program’s educational efforts engage the public on the importance of conserving coral reef ecosystems.

The program boasts a number of accomplishments. For instance, in 2015 NOAA scientists in the Commonwealth of the Northern Mariana Islands developed an innovative technique to evaluate coral reef resilience after widespread bleaching events in 2013 and 2014, this new approach will provide necessary guidance on where and what type of conservation actions with ensure the health of these reefs in the future.

### **National Estuarine Research Reserve System**

The National Estuarine Research Reserve System (NERRS) is a national network of state-managed protected areas established under the Coastal Zone Management Act. The NERRS is a partnership between participating states and NOAA. NOAA provides funding assistance, national guidance, and technical assistance, while state agencies and universities perform day-to-day management of individual reserves with input from local partners. Federal NERRS funding (70 percent) is matched by the states (30 percent) for reserve operations, research, monitoring, training, education and facilities construction. Federal NERRS funding (50 percent) for land acquisition is matched by the states (50 percent). The network of 28 unique reserves in 22 states and territories reflects the wide range of estuarine types in the U.S., each of which informs and enhances coastal stewardship through estuarine-based research, education, and training. NERRS provide long-term protection to over 1.3 million acres of state-owned estuarine lands and waters and are economically significant areas for recreation, fishing, and ecotourism.

NERR sites also serve as “living laboratories” that advance estuary and data literacy and provide meaningful, hands-on educational experiences for adults, children, and teachers. They allow scientists and members of the public to explore solutions to crucial issues such as climate change and resilience, habitat protection, and water quality. In 2015, reserves provided training for more than 10,000 coastal decision-makers in communities across the Nation. The NERR System-wide Monitoring Program (SWMP) provides water quality, meteorological time series

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<sup>3</sup> The Economics of Ecosystems and Biodiversity (TEEB), 2009.

<sup>4</sup> Wilkinson, C. *Status of Coral Reefs of the World*, 2008.

<sup>5</sup> Burke et al. *Reefs at Risk Revisited*, 2011.

data as well as habitat data important to local and state decision-makers and Federal agencies. USGS is collaborating with NERRS researchers to use SWMP data to develop a Coastal Drought Index in South Carolina.

NOAA and the State of Hawaii will soon designate the system's 29th reserve. The new He'eia National Estuarine Research Reserve will cover over 1,000 acres of land and water in Kane'ohe Bay in Oahu, Hawai'i. Upon designation, the reserve will be managed by the University of Hawai'i's Institute of Marine Biology in collaboration with a wide array of state and local partners. NOAA is also working with its partners to develop a strategic plan, building on recommendations from a blue ribbon panel convened in November 2015, which will maintain the integrity of the existing system and maximize the benefits of future system expansions.

The NERRS Science Collaborative is the competitive grant program through which most of the NOAA-funded research undertaken at the reserves is accomplished. NOAA awards an average of \$3 million each year. All projects contribute to the national effort to make the coast more resilient to natural and man-made changes. A unique aspect is community involvement, where local people who need science help, design and carry out each project. An added benefit is obtained through the interconnectivity of the reserve system, since project results from one reserve can easily be transferred and benefit all.

## **Sanctuaries and Marine Protected Areas**

### *National Marine Sanctuaries*

Under the National Marine Sanctuary Act, NOS manages and operates the Nation's system of 13 marine sanctuaries and the Papahānaumokuākea Marine National Monument. The underwater parks range in size from the one-square-mile Monitor National Marine Sanctuary near Cape Hatteras, North Carolina to over 13,500-square-mile Papahānaumokuākea Marine National Monument in the waters off America Samoa. Together, these areas encompass over 172,000 square miles of ecologically significant marine habitats. Unique sanctuaries habitats include deep ocean and near-shore coral reefs, live bottom, whale migration corridors, deep-sea canyons, areas of deep water upwelling, submerged banks that rise close to the ocean surface, kelp forests, and sea grass beds. The sanctuary system also protects maritime heritage assets such as shipwrecks.

Individual sanctuary and monument offices are responsible for the system's daily operations and a wide variety of education, research, monitoring and management activities. They develop, implement, and systematically review comprehensive place-based management plans as well as administer local research and monitoring programs. Sanctuary offices coordinate cultural resource programs, education and outreach activities, volunteer programs, and citizen advisory councils. They also coordinate through partnerships to enforce sanctuary regulations and permit otherwise prohibited activities for research and education.

The Sanctuaries' program provides oversight and guidance, system-wide research, monitoring, outreach programs review and revisions of existing management plans, evaluation of new sites, and program direction. Sanctuaries' regional offices serve as hubs for program integration with NOAA's evolving ecosystem approach to management. Sanctuary regions coordinate programs and assets among the sites, build partnerships with regional stakeholders, and facilitate interagency regional activities.

### *Marine Protected Area Coordination*

The NOAA Marine Protected Areas (MPA) Center, part of the Office of National Marine Sanctuaries, provides science, policy, and management tools to advance the effective use of MPAs for national conservation and management objectives. The MPA Center coordinates the various Federal, state, and tribal MPA programs to develop a comprehensive and integrated national system of MPAs, including NERRs and sanctuaries, that more effectively conserves areas that are significant to the Nation's natural and cultural marine heritage. The MPA Federal Advisory Committee includes representatives of industry, user groups, scientists, and others who advise on the management of the national system.

### *Sentinel Sites*

The NOAA Sentinel Site Program addresses critical coastal management science questions using place-based approaches. The NOAA Sentinel Site Program provides a framework to connect programs across disciplines and activities to inform decision-makers at relevant spatial and temporal scales. The Sentinel Site Program's initial focus is on assessing and responding to the impacts of climate change, specifically sea level change and coastal inundation. In the future, NOAA plans to expand the program's issue coverage to include other pressing issues that affect both NOAA trust resources and surrounding communities, such as ocean acidification.

Each of the five Sentinel Site Cooperatives includes a coastal commerce center and at least one sanctuary or NERR. The NOAA Sentinel Site Program leverages these existing investments to maximize the benefit of the end-to-end spectrum of products and services—monitoring, research, modeling, spatial analysis, knowledge transfer, and resource management action. The presence of significant coastal commerce at the sites maximizes the potential economic return on improved management and planning practices.

### **Schedule and Milestones:**

- Develop, update, distribute, and apply moderate resolution coastal land cover change analysis data (on five-year basis) for coastal regions (FY 2017- F2021)
- Conduct monitoring of sea level change and habitat response at four reserves (FY 2017- 2021)
- Execute 33 state coastal assessments and strategies under CZMA Sec. 309 to enhance coastal management including innovative coastal resilience strategies competitively funded under Projects of Special Merit (FY 2017-2021)
- Begin program development and ecosystem characterization at the Hawaii NERR (FY 2017)
- Complete Environmental Impact Statement and management plan to designate a NERR in Connecticut (FY 2017)
- Install best management practices to reduce pollutant loadings in U.S. Coral Reef Task Force priority watershed sites and NOAA Habitat Focus Areas (FY 2017-2021).
- Implement additional sentinel monitoring activities to assess impacts of threats (e.g. climate change, biodiversity loss, invasive species) to ONMS resources and detect early warnings of change at national, regional, and local scales (FY 2017-2021)
- Continue updating the Framework for the National System of Marine Protected Areas in the U.S. (FY 2017-2021)

- Implement data management protocols, infrastructure, and partnerships for ONMS Sentinel Monitoring Program (FY 2017-2019)

**Deliverables:**

- Data, mapping, tools, and information resources made available through Digital Coast to address competing uses of coastal resources and adaptation to coastal hazards and climate change
- Adaptation plans for two states or localities developed annually to decrease community vulnerability
- Socio-economic assessments integrated
  - with ecosystem services valuations to support coastal communities and fisheries resources to identify benefits and tradeoffs of natural infrastructure (2-3 annually)
- Expanded environmental baselines and ecological predictive tools to support ecosystem valuation and damage assessments (Two stations or tools annually)
- An average of 2,000 acres of key coastal habitats protected by state coastal management programs through acquisition or easement per year
- 140 operational monitoring stations at NERR sites delivering water quality and weather data to a wide range of private and public users
- Cooperative agreement with the Connecticut Department of Energy and Environmental Protection for the implementation of the new NERR in Connecticut (FY 2017)
- Approximately 1.6M data points per new reserve on water quality, habitat, and weather annually to support coastal management and weather forecasts. (FY 2017-2021)
- Market analysis and needs assessments that determine local and regional community needs that NERR Coastal Training Programs can address (FY 2017)
- Forecasts and models that increase reef managers' monitoring of and response to coral bleaching events
- Seven reports – one per coral jurisdiction – on the status of management capacity (organizational, human resources, legal and technical) to determine the gaps that need to be addressed for effective local resource management
- Up to 7 cooperative agreement awards annually under the expanded Regional Coastal Resilience Grants program to address coastal resilience objectives
- Complete assessments on management effectiveness of 20 Marine Protected Areas (MPAs) in priority coral reef sites
- Marine acoustics programs to determine the distribution of marine mammals and vessel traffic patterns at Stellwagen Bank and Channel Islands sanctuaries
- Develop education initiatives at all sites that protect marine mammals from vessel strikes and conduct disentanglement and rescue operations
- New education, survey, and eradication programs to avoid and mitigate introduction of invasive species in multiple sanctuaries

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Percentage of U.S. coastal states and territories demonstrating 20 percent or more annual improvement in resilience capacity to weather and climate hazards (indicator 3.3g)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	60%	60%	66%	71%	77%	77%	77%

**Description:** This measure tracks a range of contributions that address coastal community risk, vulnerability, and resilience to coastal hazards. It does this by using an index that incorporates a variety of NOAA-sponsored activities in which communities have engaged to mitigate their susceptibility to coastal hazards such as training and technical assistance. The Office for Coastal Management and NOAA Sea Grant provide the communities with this support. Each state or territory that achieves the capacity goal contributes about three percent to the annual figure. Hence, 60% means 21 of the 35 coastal states and territories achieved the goal.

<b>Performance Measure:</b> Percentage of tools, technologies, and information services that are used by NOAA partners/ customers to improve ecosystem-based management (indicator 3.3e)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	89%	91%	91%	91%	91%	91%	91%

**Description:** This measure tracks NOAA's success in providing tools, technologies, and information services that enable progress toward the principles of ecosystem-based management (considering ecological, economic, social, and security concerns) for coastal, marine, and Great Lakes ecosystems. NOAA partners and customers include Federal, state, local and tribal authorities who make decisions affecting resources in the U.S. coastal zone, and other users affecting the condition of coastal ecosystems (e.g., private industry). NOAA calculates actual performance by dividing the number of tools/services developed by the end of the year by the number proposed at the beginning of the year.

<b>Performance Measure:</b> Annual number of new or improved public access sites through CZM program.	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	385	250	250	250	250	250	250

**Description:** The Coastal Zone Management program helps communities provide the public with recreational access to the coast by funding projects such as walking paths to the shore; publicly owned parks, beaches, piers that provide fishing access to coastal waters; boardwalks and trails associated with coastal habitat such as wetlands, forests, and marshes; access to historic areas or structures such as lighthouses; and boat launches, ramps, docks, and marinas. This measure tracks the number of sites where public recreational access has been created or improved each year.

<b>Performance Measure:</b> Number of priority sites with completed and approved watershed management plans	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	19	20	21	21	21	21	21

**Description:** Land-based sources of pollution (LBSP) are a major threat to coral reefs globally. This measure is the first of a series of measures to monitor the progress of NOAA's Coral Reef Conservation Program (CRCP) to reduce LBSP from watersheds located upstream from coral reef areas. In 2010, management priority setting processes were conducted by the CRCP for each of the U.S. coral reef jurisdictions and 19 coral reef geographic priority sites containing one or more watersheds. This measure tracks the cumulative number of watersheds within priority sites that have complete and approved watershed management plans (WMPs) or conservation action plans (CAPs). The primary purpose of a WMP or CAP is to outline a comprehensive set of actions and an overall management strategy for improving and protecting watersheds from nonpoint and point sources of pollution. A WMP/CAP should incorporate a 'ridge to reef' approach to ensure coral reef ecosystems are integrated into watershed planning processes and identify a set of key recommendations, specific partners, and next steps towards implementation of the plans. Watershed management plans provide more detail than CAPs including, to the greatest extent practicable, the nine required elements of a WMP (according to the EPA Section 319 program). Once plans are approved, projects are implemented to reduce LBSP to coral reef ecosystems.

<b>Performance Measure:</b> Number of participants of focus area training activities	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	1,583	1,136	1,159	1,182	1,182	1,182	1,182

**Description:** To effectively manage coastal communities and resources, decision-makers and managers need a diverse array of skills and knowledge. This measure tracks the number of participants trained by the NOAA Office for Coastal Management on priority coastal issues (e.g., climate adaptation strategies, coastal inundation mapping) the application of geospatial technology (e.g., GIS), process skills (e.g., project design and evaluation), and tool-based trainings that explain how to apply certain customized decision support tools to coastal management (e.g., CanVis).

<b>Performance Measure:</b> Annual number of data points collected in national estuarine research reserves via monitoring stations (millions)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	45.0	45.0	47.4	50.0	50.0	50.0	50.0
<b>Description:</b> The System-wide Monitoring Program (SWMP) of the National Estuarine Research Reserve System (NERRS) collects data on water quality and weather, and has identified and assessed contaminant spills, measured impacts from storm water and hurricanes, and analyzed water quality conditions related to fish kills and shellfish diseases. The data help track short-term variability and long-term changes in coastal waters to understand how human activities and natural events can change ecosystems. This measure tracks the how much data the program collects each year. Performance increase will result from two additional research reserves with SWMP data collection.							

<b>Performance Measure:</b> Number of NMS sites that maintain or improve water quality, habitat, and living marine resources	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	12	12	12	12	12	12	12
<b>Description:</b> This measure assesses the status of water quality, habitat, and/or living marine resources based on indicators of biodiversity, key species, extracted species, invasive species, and health and human impacts. The NMS program and independent evaluators (universities, research institutions SAC research subcommittees, and environmental consultants) evaluate data to determine whether the condition is improving, remaining stable (maintaining), or deteriorating. For each sanctuary, a "condition report" integrates the best available science and interpretation to quantify the status and trends of water quality, habitat, and living resource conditions.							



<b>Performance Measure:</b> Number of coastal communities that completed projects to reduce future damage from or increase public awareness of hazards with assistance from CZM funding or staff (annual)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	81	75	85	95	105	115	115

**Description:** NOAA's Coastal Zone Management program supports a variety of state and local efforts to ensure that coastal communities are aware of and prepared for coastal hazards (e.g., flooding, coastal storms). These efforts include the development or update of local coastal hazard plans, local coastal hazard mitigation policies, ordinances or codes, technical assistance, education and outreach, and on-the-ground projects to reduce future damage from hazards.

This measure tracks the number of communities that complete awareness/preparedness projects with assistance from CZM funding or staff. Targets reflect the fact that some projects require multiple years to complete. The CZMA Performance Measure System Guidance defines coastal community as a unit of local government or a special unit of government, such as a planning district. In coastal zones without local governments (e.g., U.S. territories), a coastal community may be an administrative body or organization that formally represents a local geographic area.

<b>Performance Measure:</b> Number of communities that utilize Digital Coast (indicator 3.3a)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	6,330	5,500	5,550	5,550	5,500	5,500	5,500

**Description:** Digital Coast is a web-based platform that provides public access to coastal data (e.g., coastal LIDAR, coastal land cover change, socioeconomic data, electronic nautical charts, and emergency response imagery) and tools, training, and case studies useful to turn these data sets into actionable information. Communities can use this information to support coastal management activities such as conserving and restoring habitat, protecting communities from storms and coastal hazards, revitalizing urban waterfronts and ports, and providing public recreational access. For this measure, communities are defined as Census-designated places within coastal states including all Census-defined cities, towns, townships, boroughs, and incorporated municipalities. A community is considered to be using Digital Coast if it visits the website or downloads a dataset or tool.

## PROGRAM CHANGES FOR FY 2017:

**Coastal Zone Management and Services: Integrated Water Prediction: Driving Decisions for a Water-Prepared Nation (Base Funding: \$0 and 0 FTE; Program Change: +\$2,500,000 and + 2 FTE):** NOS requests an increase of \$2,500,000 and 2 FTE for a total of \$2,500,000 and 2 FTE to develop and 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. This cross-line office initiative with NOAA's National Weather Service (NWS) (pages NWS-31, 66) begins a multi-year strategy to improve water intelligence services provided to the Nation. The request across both line offices totals \$12,250,000 and 11 FTE.

### **Proposed Actions:**

As the Federal agency charged with water prediction and warning responsibilities, NOAA is uniquely positioned to address water challenges facing our Nation.<sup>6</sup> NOAA is establishing the IWP program to deliver improved water intelligence 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, water-quality hazards, reduced freshwater supply, and other risks. IWP will provide information necessary for decision making during high-impact events (e.g., hurricanes, nor'easters, storm surge) and for routine water management (e.g., ecosystem health, low flow, transportation, agriculture). These new decision support services will ultimately mitigate adverse water impacts while building resilient communities. NOAA will establish an initial IWP capability through three essential and interdependent core components:

1. **New and improved water prediction services (\$1,000,000 NOS, \$9,500,000 total)** that
  - a. connect risk and vulnerability analyses and integrated water predictions to 'street-level' community impacts;
  - b. conduct initial IWP operations at the National Water Center (NWC); and
  - c. increase cross-government collaboration with other Federal partners through incentives for co-location at NWC.
2. **New service delivery model for coastal and inland communities (\$1,000,000 NOS, \$1,250,000 total)** that provides services and products (e.g. Geographic Information System tools integrating high-resolution water level information) to local decision-makers and engages with technical parties to ensure collaboration among multiple disciplines.
3. **Model integration and forecast assessment (\$500,000 NOS, \$1,500,000 total)** that links the current generation of terrestrial and coastal models into a common format to establish an IWP system for local decision makers to assess flood risk following a severe storm, for instance. This component also will develop the next generation of integrated Earth system models to enhance forecast precision and will systematically assess forecast skill and diagnose watershed scale processes.

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<sup>6</sup> <https://www.gpo.gov/fdsys/granule/USCODE-2010-title15/USCODE-2010-title15-chap9-sec313/content-detail.html>

<b>Integrated Water Prediction</b>			
FY 2017 NOAA Request	ORF	PAC	TOTAL
NOS	\$2,500,000	\$0	\$2,500,000
NWS	\$5,250,000	\$4,500,000	\$9,750,000
<b>TOTAL</b>	<b>\$7,750,000</b>	<b>\$4,500,000</b>	<b>\$12,250,000</b>

NOS will lead the *new service delivery model* core component. At present, atmospheric, riverine, coastal, and terrestrial scientists each use different data formats, modeling tools, and practices. The new service delivery model will bring these interdisciplinary practitioners together to establish common data standards, baseline knowledge, and protocols to ensure that model development and final products meet stakeholder needs. NOS will support the other components of this initiative as all three pieces are closely linked. NOS will assist with model improvement by incorporating coastal inundation models, for instance, and by using model outputs to better inform communities through decision support products and partnership-building services.

This initiative supports all of the objectives in the DOC Strategic Plan Environment Goal focusing on community needs for products, information, and services in the face of environmental changes, specifically the effects of too much, too little, or poor quality water. The IWP initiative also reflects the multi-agency science and technology priorities for FY 2017 established by the Office of Science and Technology Policy. The specific priorities supported by this cross-line office initiative are 1) global climate change, 2) national and homeland security, and 3) ocean and Arctic issues, and 4) R&D for informed policy-making and management. The IWP initiative addresses these by developing actionable data and related tools to inform policy making and management through a focus on water extremes, water security, and water quality, responding to community needs for enhanced services and products to prepare for and cope with the effects of too much, too little, or poor quality water.

**Statement of Need and Economic Benefits:**

Today, the United States’ water prediction capability is extremely limited. Less than one tenth of one percent of the nation’s inland rivers and streams have associated forecasts - which are critical to a wide range of users, including farmers, fishermen, hydroelectric dam operators, and local municipalities. These forecasts, which are the basis for river flood and flash flood warnings, watches, and advisories, are lacking even within most of the nation’s heavily populated coastal regions. Only the East Coast and the Gulf of Mexico have high-resolution coastal and estuarine inundation predictions. Additionally, since the coastal and estuarine model system is not connected to the entire inland model system, the nation’s coastal population has no understanding of how terrestrial and coastal waters combine to affect their communities. Stakeholders across regional and socioeconomic sectors continue to demand integrated, accessible and consistent water prediction information to improve water related decisions in the wake of floods, droughts, and threats to water quality.

The National Academy of Sciences (NAS) has urged NOAA to modernize and transform its hydrologic prediction capabilities and to move water prediction into the realm of Earth system prediction. IWP will begin that process by advancing in-house capabilities and leveraging existing collaborations with Federal agencies - including those under IWRSS - such as the United States Army Corps of Engineers (USACE), the United States Geological Survey (USGS), the Federal Emergency Management Agency (FEMA), State-based research institutions, and other public and private entities.

**Resource Assessment:**

NOAA opened the National Water Center (NWC) in Tuscaloosa, Alabama in 2015. The NWC serves as an interagency center of excellence, enabling researchers from varying yet related disciplines to leverage the collaboration and efficiencies that result from co-location to accelerate development of the Nation's integrated water prediction capability. Recent NOAA President's budgets have prioritized improvements in flood forecasting and inundation mapping. Demonstration projects began in 2015 and are planned for 2016. Funding in FY 2015 and FY 2016 has advanced key NOAA water prediction components, while Disaster Relief Appropriations Act, 2013 funds have enabled implementation of fundamental, coupled coastal and terrestrial models for over half of the Atlantic and Gulf Coast major riverine systems, a necessary foundation for the development of Next Generation Modeling capabilities. NOAA's investments addressing centralized water forecasting improvements, high performance computing (HPC), and coastal intelligence data for decision support are critical to this effort.

**Schedule and Milestones:**

*New and Improved Water Prediction Services (NWS lead, NOS assist, OAR engaged):*

FY 2017 - 2019

- Harmonize and link the geospatial data sets of the National Geospatial Intelligence Agency's Homeland Security Infrastructure Program (HSIP) database (nation-wide) and the NOAA Digital Coast to develop an infrastructural impacts catalog – which will look at risk to inundation of economically significant infrastructure across the Nation

FY 2020

- Provide integrated sector-specific decision-support operations and services with linkages to geospatial impact data using coupled Weather Research and Forecast (WRF)-Hydro framework

*New service delivery model (NOS lead, NWS assist, OAR engaged):*

FY 2017 - 2021

- Engage user groups and conduct focus groups to inform system design and development processes

FY 2017

- Implement the new service delivery model
- Collaborate with Cooperative Institutes and other partners to conduct IWP-specific model coupling and testing, data assimilation and tool development

*Model Integration (NWS, NOS)*

FY 2017 – 2021

- Implement the hurricane and extra-tropical surge and tide operational forecast system (ADCIRC-based) coastal modeling suite in regions where it is not yet available (FY 2017- 2019)
- Test, assess, refine, and optimize a basic integrated water prediction framework over demonstration regions (FY 2017- 2020)

**Deliverables:**

- Water-level products for coastal storms that combine inland and coastal water levels for the “integrated water” impact on coastal communities
- Targeted community vulnerability and impact reports for the east coast and Gulf of Mexico
- Region-specific needs assessments and related requirements analyses for community-level water forecasts in east coast, Gulf of Mexico, and west coast regions
- National and regional workshops aimed at engaging external stakeholders in Integrated Water Prediction framework development
- Coastal models that link to terrestrial processes

**Performance Goals and Measurement Data:**

Joint Performance Measure							
<b>Performance Measure:</b> Number of communities with completed analyses and community impact assessments (cumulative)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	4	8	15	25	35
<b>Without Increase</b>	2	3	3	3	3	3	3
<p><b>Description:</b> NOAA will work with communities around the United States to assess their risk and vulnerability to inland and coastal flooding. A completed impact assessment means that each community will have prioritized their community's risk and vulnerability from floods, both inland and coastal, and will understand how the integrated water forecasts, enabled by the increase of forecast locations associated with the IWP initiative, can help them adapt or mitigate their risks. For this measure, communities are defined as participating jurisdictions within states, including cities, towns, counties, or other groupings of participating jurisdictions, as agreed upon by the participants.</p>							

Joint Performance Measurement							
<b>Performance Measure:</b> Percent of coastal population that will receive integrated water forecasts (i.e. forecasts coupled with terrestrial and marine models), and socioeconomic risk assessments, that do not as of FY 2015	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	4%	11%	21%	35%	50%
<b>Without Increase</b>	0%	0%	0%	0%	0%	0%	0%
<p><b>Description:</b> Currently, 100 million people living on the coast currently do not receive a hydrologic forecast. NOAA will implement and couple terrestrial and marine models, beginning in FY 2017, to produce integrated water level forecast data for the coastal population, and provide an assessment of socioeconomic risk associated with those forecasts. In order to meet this metric, NOAA will develop and generate products and services for water forecasts, prepare the public to receive and use the forecasts, and regionally implement the service delivery model. When NOAA achieves 100 percent, the entire U.S. coastal population will receive actionable, integrated water forecast information.</p>							

**PROGRAM CHANGE PERSONNEL DETAIL**

**Program:** National Ocean Service  
**Sub-program:** Ocean and Coastal Management and Services  
**Program Change:** Integrated Water Prediction

<b>Title:</b>	<b>Location</b>	<b>Grade</b>	<b>Number of Positions</b>	<b>Annual Salary</b>	<b>Total Salaries</b>
Social Scientist	Tuscaloosa, AL	ZP-IV	1	84,553	84,553
Physical Scientist	Tuscaloosa, AL	ZP-IV	1	84,553	84,553
<b>Total</b>			<u>2</u>		<u>169,106</u>
less Lapse		25%	<u>0.0</u>		<u>(42,277)</u>
Total full-time permanent (FTE)			2		126,830
2017 Pay Adjustment (1.6%)					<u>2,029</u>
<b>TOTAL</b>					<u>128,859</u>
<b>Personnel Data</b>			<u>Number</u>		
Full-Time Equivalent Employment					
Full-time permanent			2		
Other than full-time permanent			0		
Total			<u>2</u>		
Authorized Positions:					
Full-time permanent			2		
Other than full-time permanent			0		
Total			<u>2</u>		

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Program:** National Ocean Service  
**Sub-program:** Ocean and Coastal Management and Services  
**Program Change:** Integrated Water Prediction

<b>Object Class</b>	<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11 Personnel compensation		
11.1 Full-time permanent	\$129	\$12,956
11.3 Other than full-time permanent	0	0
11.5 Other personnel compensation	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	<u>129</u>	<u>12,956</u>
12 Civilian personnel benefits	34	4,400
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	190	1,326
22 Transportation of things	0	20
23.1 Rental payments to GSA	0	0
23.2 Rental Payments to others	0	926
23.3 Communications, utilities and misc charges	0	659
24 Printing and reproduction	0	9
25.1 Advisory and assistance services	1,236	20,893
25.2 Other services	611	611
25.3 Purchases of goods & services from Gov't accounts	0	0
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	300	300
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	376
31 Equipment	0	265
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	100
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	<u>2,500</u>	<u>\$42,841</u>

\* Due to financial system limitations, the object class detail for the Program reflects the full Coastal Zone Management and Services PPA.



**Coastal Zone Management and Services: Ecosystem-Based Solutions for Coastal Resilience (Base Funding: \$0 and 0 FTE; Program Change: +\$5,000,000 and 0 FTE):**

NOAA requests an increase of \$5,000,000 and 0 FTE for a total of \$5,000,000 and 0 FTE for an integrated, cross-Line Office and interdisciplinary initiative to better inform decision-making with respect to the stewardship and resilience of inshore ecosystems and the living resources and the human communities that depend on them. This initiative will complement the NOAA's National Marine Fisheries Service (NMFS) proposal "Ecosystem-based Solutions for Fisheries Management" (page NMFS-44 ). The NOS component of this proposal will apply resources in physical and social sciences to help coastal planners integrate ecosystem-based solutions into hazard mitigation, resilient coastal development, and post-disaster rebuilding.

**Proposed Actions:**

The NMFS and NOS requests recognize that coastal ecosystems (e.g., marshes, dunes, mangroves, etc.) serve the dual purposes of habitat for fish and protected species and a physical defense for coastal communities from extreme weather and changing ocean conditions. NOS proposes to help coastal communities evaluate natural infrastructure in terms of hazard mitigation, resilient coastal development, and post-disaster rebuilding decisions. NOS will assess the effectiveness of natural infrastructure and natural floodplains for protecting coastal property from long-term inundation threats (e.g., changes to sea level, tides, and wave erosion).

Working through the NOAA Habitat Conservation Team, NMFS and NOS will cooperatively select a region or regions in which to implement this effort. Within the selected region(s), NOAA will develop projects in partnership with local and regional scientists, resource managers, and community decision-makers. The projects would include phased activities beginning with a) foundational research and data collection; b) economic valuation; and c) assessment, modeling, and decision support tool development. In addition, NOS will provide support for training, communication, and planning.

NOS and NMFS will assess the value of ecosystems as 1) protective of coastal infrastructure in the face of inundation risk and inshore habitat loss and 2) habitat for sustainable and healthy populations of fish and protected species. Ecosystem valuation allows coastal planners and fisheries managers to conduct cost-benefit and other analyses that fully reflect the value of ecosystem services in the context of potential development and resource use.

The integrated execution of these initiatives recognize that coastal ecosystems serve as both habitat for managed species and as a physical defense for coastal communities (e.g. marshes, dunes, mangroves, etc.), as well as providing benefits such as improved water quality, carbon sequestration, reduced habitat fragmentation, and sites for recreation.

Using a place-based approach NOAA will work closely with local resource managers and stakeholders in selected locations to identify requirements for surveying, monitoring and technical assistance. NOS will work with NMFS to synthesize the best available ecological and socio-economic data to provide fisheries and coastal managers with a broader understanding of how ecosystem restoration, coastal development, and planning considerations affect both fish stocks and community resilience. The two initiatives will develop shared study designs (where applicable) to maximize efficiency of assessment efforts. Shared assessment data will improve understanding of ecosystem services and have the added benefit of providing baseline conditions for assessing damage to ecosystem services from future events such as coastal storms and oil spills.

NOS will train and advise coastal practitioners and decision makers on how to incorporate this information and apply adaptive management measures to long-term planning. Outreach efforts will include support for new and existing communities of practice (COP) to develop and share lessons-learned and successful approaches using natural infrastructure solutions among coastal partners and communities.

**Statement of Need and Economic Benefits:**

Approximately 163 million Americans live near the coast and 89 million people vacation on the coasts every year<sup>7</sup>. According to a report released in March 2014 by the Census Bureau, the population in the counties directly along the coast experienced a 39 percent increase in population from 1970 to 2010. The population density at the coast is expected to continue increasing into the future, further intensifying the pressures of development on ecologically and economically important areas and human exposure to the impacts of climate change, such as sea level rise and coastal storms. In order to increase resilience of valuable marine resources, communities, and coastal economies, coastal decision makers urgently need up-to-date information on the tradeoffs between ecosystem services and other uses of coastal lands and waters.

NOAA is authorized by the Magnuson-Stevens Act, Endangered Species Act, Coastal Zone Management Act, Coral Reef Conservation Act and other laws to conserve, manage, and promote sound management of coastal and marine ecosystems and resources. Currently, NOAA possesses an incomplete understanding of the economic value and performance of ecosystem services and their vulnerability to the cumulative effects of climate change and other stressors like coastal development. Better fisheries management and resilient communities require an understanding of the economic value provided by these habitats and the living resources they support, and the role that natural environment plays in coastal protection.

NOAA will improve understanding of these dynamics and translate the environmental intelligence to informed decisions on protecting and enhancing these critical ecosystem services. By improving understanding the value of coastal habitats' ecosystem services and their interconnections, NOAA partners can better prioritize conservation and restoration resources, define essential fish habitat (EFH) and critical habitat, and incorporate resilient natural infrastructure into development. Better-informed decisions will yield more effective coastal resource management, hazard resilience strategies and disaster recovery efforts to the benefit of coastal communities and economies.

**Resource Assessment:**

The resources of several NOAA programs contribute to observations, data management, models and visualization tools, and development of adaptation strategies. Specific ecosystem valuation data are needed to realize the next levels of protection, preparedness and adaptation to address both current and future risk. In FY 2016, NMFS is administering a \$10.0 million Coastal Ecosystem Resilience Grants program to support implementation of actions that build resilience of coastal and ocean ecosystems, and NOS is administering \$5.0 million for a Regional Coastal Resilience Grants program to support implementation of actions that directly build resilience of coastal communities. This proposal will complement and inform regional and

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<sup>7</sup> NOAA's 2013 State of the Coast Report: National Coastal Population Report, <http://stateofthecoast.noaa.gov/features/coastal-population-report.pdf>; U.S. Commission on Ocean Policy: An Ocean Blueprint, 2004, [http://jointoceancommission.org/documents/USCOP\\_report.pdf](http://jointoceancommission.org/documents/USCOP_report.pdf)

community-based activities funded via these two grant programs as well as other investments in coastal infrastructure and ecosystems, both Federal and non-Federal.

**Schedule and Milestones:**

- Expand baseline environmental data (e.g., SETS, wetland vegetation assessments, water level monitoring) and assessment of shoreline conditions and land use patterns (FY 2017-2021)
- Develop market and non-market ecosystem value information in coordination with NFMS to inform ecosystem restoration, conservation, and resilience initiatives (FY 2017-2021)
- Apply environmental and economic data to more rapidly and accurately assess damages to natural resources and better quantify the benefits of natural infrastructure (FY 2018-2021)
- Develop online training modules to deliver specialized knowledge for response and recovery actions that improve scientific capacity for disaster management and ability to conduct natural resource damage assessments (FY 2017-2018)
- Develop enhanced hazard visualizations and predictive tools. (FY 2018-2021)
- Support training and place-based, pre-disaster preparedness and disaster mitigation planning, response, and recovery operations (FY 2019-2021)

**Deliverables:**

- Socio-economic assessments integrated with ecosystem services valuations to support coastal communities and fisheries resources to identify benefits and tradeoffs when implementing natural infrastructure solutions (2-3 annually)
- Tools and visualizations that support coastal community decision makers. (1 annually)
- Support for existing or new “Communities of Practice” to expand application of products and exchange knowledge and lessons learned about natural infrastructure uses and impacts. (1-2 annually)
- Expanded environmental baselines and ecological predictive tools to support ecosystem valuation, and damage assessments. (2 stations or tools annually)
- Risk communication and/or social marketing strategies to support ecosystem-based solutions to mitigate storm surge and flooding. (1-2 annually)
- Technical assistance and trainings. (2-3 annually)
- Response, mitigation and adaptation plans, strategies, and policies developed within coastal states and communities (1-2 annually)

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Number of communities that utilize Digital Coast (indicator 3.3a)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	5,750	5,800	5,850	5,875	5,875
<b>Without Increase</b>	6,330	5,500	5,500	5,500	5,500	5,500	5,500
<b>Description:</b> This measure tracks the number of coastal communities that visit the Digital Coast website to obtain coastal information resources. “Coastal communities” are defined as census-designated places (CDPs includes cities, towns, villages, townships) within each coastal state. This measure is used in concert with the number of total web visits and the number of data and tools downloaded to determine outreach effectiveness and web content changes in providing data, tools, training, and related information resources to coastal communities.							

<b>Performance Measure:</b> Percentage of U.S. coastal states and territories demonstrating 20 percent or more annual improvement in resilience capacity to weather and climate hazards (indicator 3.3g)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	66%	74%	80%	80%	80%
<b>Without Increase</b>	60%	60%	66%	71%	77%	77%	77%
<b>Description:</b> This measure tracks a range of contributions to address coastal community risk, vulnerability, and resilience to coastal hazards. It quantifies NOAA’s contributions to this important goal across NOAA’s coastal programs, measuring how NOAA is improving the Nation’s capacity for resilience to hazards and is contributing significantly to NOAA’s efforts to improve integration of its coastal programs, and expanding beyond the two coastal integration programs providing inputs to the measure (OCM and Sea Grant).							

<b>Performance Measure:</b> Virtual training modules developed for decision-makers and responders to support disaster response planning and preparedness.	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
With Increase	N/A	N/A	1	2	2	2	2
Without Increase	1	1	1	1	1	1	1
<b>Description:</b> NOAA/OR&R presently offers in-person training for responders on topics including the Science of Oil Spills, Aerial Observer Training, and the Shoreline Cleanup and Assessment Technique (SCAT), but these opportunities are volume-limited by staff availability and class size and cannot meet demand. Making these training modules available virtually would provide first responders and other stakeholders in geographically dispersed (including tribal, territorial and rural) communities, as well as new response staff who may be unable to travel, access to these valuable trainings that enhance safety and effective scientific support for all-hazards incidents.							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Program:** National Ocean Service  
**Sub-program:** Ocean and Coastal Management and Services  
**Program Change:** Ecosystem-based Solutions to Support Coastal Community Resilience

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$12,827
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<hr/> 0	<hr/> 12,827
12	Civilian personnel benefits	0	4,366
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	1,136
22	Transportation of things	0	20
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	926
23.3	Communications, utilities and miscellaneous charges	0	659
24	Printing and reproduction	0	9
25.1	Advisory and assistance services	3,000	22,657
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	376
31	Equipment	0	265
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	2,000	2,100
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<hr/> \$ 5,000	<hr/> \$45,341

\* Due to financial system limitations, the object class detail for the Program reflects the full Coastal Zone Management and Services PPA.

**Coastal Zone Management and Services: Capacity to Respond to Extreme Events (Base Funding: \$40,341,000 and 137 FTE; Program Change: +\$4,006,000 and 0 FTE):** NOAA

requests an increase of \$4,006,000 and 0 FTE for a total of \$44,347,000 and 137 FTE to build internal capacity to support community response and resilience to extreme events. Capacity 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.

**Proposed Actions:**

NOAA requests an increase of \$4,006,000 to help coastal communities prepare for, respond to, and recover more quickly from, natural disasters. These targeted extensions of NOAA products and services will build on recovery efforts and lessons learned from recent extreme weather events through the following:

- An enhanced network of expanded real-time inundation observations will provide a broader base of accurate information.
- Improved inundation modeling will improve storm surge forecasts and long-term detection of sea level impacts.
- Targeted technical assistance and risk communication strategies will inform planning and management decisions.
- Strengthening connections among NOAA capabilities (e.g., NOAA Sentinel Site program), monitoring sites (e.g., tide stations and NERRS sentinel stations), and decision makers will improve management activities.

NOAA will deliver actionable information and technical assistance to help states and local communities to leverage existing data and tools for coastal planning and development decisions. Many existing products for marine navigation, if combined with value-added services, could inform protection of land-based coastal resources from inundation. For example, coastal communities have requested tools that describe inundation risk in terms of physical landmarks rather than a tidal datum.

Translating NOAA water level and elevation data and storm surge forecasts into forms that are readily useful to coastal communities will improve their preparedness for, response to, and recovery from disasters; protection of inland infrastructure, and adaptation to changing ocean conditions. NOAA will maximize the benefits of this information using improved methods of communicating risk that effectively induce sound management actions.

**Statement of Need and Economic Benefits:**

America's coastal communities and shorelines are facing escalating risks from changes in storm intensity, precipitation, flooding, and sea level change that can result in dramatic economic losses. Inundation from extreme weather events, exacerbated by sea level rise, is an acute and increasingly frequent risk to the coasts. NOAA's National Climatic Data Center recorded 14 weather and climate-related disasters with over \$1.0 billion in damages each in 2011. In 2012, AON Benfield (an insurance broker) recorded 11 disasters with over \$1.0 billion in damages. Coastal areas also account for the most repetitive flood loss claims with the National Flood Insurance Program (NFIP) and the private casualty loss insurance industry, at a cost of \$200 million per year for the NFIP alone. Furthermore, a recent Heinz Center study reported that insurance claims generally account for only half of the total losses associated with any disaster event.

According to the Census Bureau, the population in the counties directly along the coast experienced a 39 percent increase in population from 1970 to 2010. The population density at the coast is expected to continue increasing into the future, further intensifying the pressures on ecologically and economically important areas, and putting more people, infrastructure, and businesses/ economic drivers in the path of coastal storms. Potential economic impacts are significant in this region, as coastal economies contributed \$8.3 trillion to the GDP in 2010 (58 percent).

**Resource Assessment:**

A majority of the current social science support for NOAA is supplemented through limited, yet productive, grants and contracts with academia and private industry. This request allows NOAA to incorporate social science expertise into the life cycle of product development, providing more targeted messaging, delivery mechanisms, training, and evaluation to NOAA customers.

Observations, data management, and analysis; the development and application of models and visualization tools; appropriate education and outreach; and the inclusion of adaptation strategies for the management of NOAA trust resources are all being conducted within the current resources of many NOAA programs. In addition, NOAA's supplemental funding resulting from Hurricane Sandy is already supporting technical assistance activities in Sandy-affected communities. The support outlined in this proposal would build upon these efforts, transferring lessons-learned to other regions working to improve their resilience before the next extreme event.

**Schedule and Milestones:**

FY 2017:

- Extend water level benchmarks networks to provide inundation information at locally-significant landmarks to improve communication of risk
- Improve accuracy of water level inundation predictions for all vulnerable coastal regions by transitioning to operations community-based models that provide a high resolution ensemble of surge/tide/wave modeling systems
- Simplify and align communication of NOAA's real-time products, observations, forecasts, and seasonal outlooks by improving mechanisms to promote situational awareness and referencing terms readily understood by emergency managers and the public
- Collect non-Federal IOOS models and data sets to support ensemble approaches and Next Generation Storm Surge Modeling and evaluation via the U.S. IOOS Coastal and Ocean Modeling Testbed (COMT)
- Enhance flood inundation impacts viewer by incorporating probabilistic seasonal outlooks and extremes
- Develop outreach and training materials based on social science and assessments related to communicating storm surge and sea level rise risks

FY 2018-2021:

- Document evaluation results of modeling capabilities to ensure complementary non-Federal and Federal approaches and improved efficiency
- Integrate social science research, methods, and tools improve risk communication and the public's response to risks across multiple inundation products and time scales (storm surge forecasts, FEMA FIRMs, sea level change mapping)
- Improve visualizations and animations of inundation events and scenarios



- Support and enhance a network of place-based sentinel sites providing information that informs planning and decision-making related to extreme events and climatic impacts
- Support improved local strategies and policies to address inundation

**Deliverables:**

- Protocols and practices for establishing benchmarks and water level stations for real-time inundation reporting (water level height above ground level) and integration into NERRS Sentinel Sites to address long term impacts
- Outreach and training materials for emergency managers to understand how to relate storm surge forecasting with real-time water level observations to more clearly communicate predicted water level and risk
- Place-based, coordinated disaster response planning in coordination with coastal states and communities to support development of response protocols, mitigation/adaptation strategies, and identification of environmental stressors and potential environmental resources at risk

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Number of communities that utilize Digital Coast (indicator 3.3a)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	5,750	5,800	5,850	5,875	5,875
<b>Without Increase</b>	6,330	5,500	5,500	5,500	5,500	5,500	5,500
<b>Description:</b> This measure tracks the number of coastal communities that visit the Digital Coast website to obtain coastal information resources. “Coastal communities” are defined as census-designated places (CDPs - includes cities, towns, villages, townships) within each coastal state. This measure is used in concert with the number of total web visits and the number of data and tools downloaded to determine the effectiveness of outreach efforts and web content changes in providing data, tools, training, and related information resources to coastal communities.							

<b>Performance Measure:</b> Percentage of U.S. coastal states and territories demonstrating 20 percent or more annual improvement in resilience capacity to weather and climate hazards (indicator 3.3g)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	66%	74%	80%	80%	80%
<b>Without Increase</b>	60%	60%	66%	71%	77%	77%	77%
<b>Description:</b> This measure tracks a range of contributions to address coastal community risk, vulnerability, and resilience to coastal hazards. It quantifies NOAA’s contributions to this important goal across NOAA’s coastal programs, measuring how NOAA is improving the Nation’s capacity for resilience to hazards and is contributing significantly to NOAA’s efforts to improve integration of its coastal programs, and expanding beyond the two coastal integration programs providing inputs to the measure (OCM and Sea Grant).							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Program:** National Ocean Service  
**Sub-program:** Ocean and Coastal Management and Services  
**Program Change:** Capacity to Respond to Extreme Events

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$12,827
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<hr/> 0	12,827
12	Civilian personnel benefits	0	4,366
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	1,136
22	Transportation of things	0	20
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	926
23.3	Communications, utilities and miscellaneous charges	0	659
24	Printing and reproduction	0	9
25.1	Advisory and assistance services	3,506	23,163
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	376
31	Equipment	0	265
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	500	600
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<hr/> \$ 4,006	\$44,347

\* Due to financial system limitations, the object class detail for the Program reflects the full Coastal Zone Management and Services PPA.

**Coastal Zone Management and Services: AmeriCorps Resilience Corps Training and Technical Assistance (Base Funding: \$0 and 0 FTE; Program Change: +\$2,000,000 and 0 FTE):** NOAA requests an increase of \$2,000,000 and 0 FTE for a total of \$2,000,000 and 0 FTE for a community resilience training and technical assistance program for the AmeriCorps Resilience Corps Pilot Program.

**Proposed Actions:**

The new Resilience Corps Program of the Corporation for National and Community Service (CNCS) will help communities advance their resilience goals. With this budget increase, NOAA will build a training network of Resilience Corps AmeriCorps members to provide effective technical assistance, guidance, and on-the-ground support to communities where they will be working. Resources for these Resilience Corps members' deployment and support are being requested separately by the Corporation for National and Community Service in FY 2017.

NOAA will develop a sustained training program, including curricula, online resources and tools, in partnership with the CNCS and other Federal agencies (e.g., EPA, DOE, DOI, USDA, and FEMA) and organizations engaged in resilience planning. The training will leverage available technical assistance resources, including Federal tools that communities can use to identify climate-related risks and develop community resilience plans. NOAA will tailor additional technical assistance as needed for the members working in coastal communities. NOAA will deliver the training and ongoing technical assistance support through a network of trainers and technical assistance resource specialists that builds on existing partnerships.

In FY 2015 and FY 2016, NOAA, CNCS, EPA and DOE are collaborating with the Rockefeller Foundation and Cities of Service to conduct a two-year pilot of AmeriCorps Resilience. AmeriCorps VISTA volunteers in ten cities around the Nation will support a range of resilience planning and implementation needs, addressing the impacts of flooding, storms, extreme temperatures, and other extreme events. NOAA, together with Federal and non-profit partners, is providing access to existing training and technical assistance for these volunteers. Lessons learned from the pilot will be incorporated into the design of the sustained training program.

This training and technical assistance program will provide a community-focused component that complements other resilience increases in the FY 2017 President's request that address decision support needs and regional project implementation (Regional Coastal Resilience Grants, Ecosystem Based Solutions for Resilience, Integrated Water Prediction, and Capacity to Respond to Extreme Events).

**Statement of Need and Economic Benefits:**

America's coastal communities and shorelines are facing escalating risks from changes in storm intensity, precipitation, flooding, and changing sea levels that can result in dramatic economic losses. Increasing population density along the coast is putting more people in the path of coastal storms and intensifying pressures on ecologically and economically important areas. A 2011 report by the New York State Energy Research and Development Authority warned that the combination of sea level rise and coastal surge that can accompany a powerful storm could flood much of New York City's major infrastructure; the economic losses from a 100-year storm could range from \$58 billion to \$84 billion.<sup>1</sup> The estimated \$65 billion in damages from Superstorm Sandy, which overwhelmed the city in October 2012, falls directly within that range.<sup>2</sup> NOAA's National Climatic Data Center recorded 14 weather and climate-related disasters in 2011 with over \$1 billion in damages each, the highest number on record for a single year. The economic disruptions extend beyond the path of the extreme event to economic sectors that rely on coastal industries.

Investing in community resilience will reduce the economic impacts of these hazards and improve national economic security. A 2005 study by the National Institute of Building Sciences on Federal hazard mitigation grants estimated that \$1 spent on hazard mitigation potentially leads to avoidance of \$4 in disaster relief costs and lost Federal tax revenue. Likewise, strengthening natural infrastructure will increase the resilience of communities and ecosystems and protect our valuable coastal economies and resources.

Most decisions to increase resilience are made at the state and local levels (e.g., coastal development, infrastructure and critical facilities siting, ecosystem restoration, etc.). Therefore, partnerships and decision support are essential to any Federal effort to effect improvements in resilience. The Corporation for National and Community Service's programs are well positioned to disseminate the necessary resilience and preparedness expertise to local communities. The Resilience Corps program and associated training will use approaches that have demonstrated success through programs such as FEMA Corps, Civic Spark, and Citizen Corps.

**Resource Assessment:**

This proposal would leverage existing NOAA training and technical assistance activities. NOAA has resource investments in resilience training development and delivery through the Office for Coastal Management and the National Sea Grant Program. These existing activities and networks offer established mechanisms for curriculum development and delivery for coastal decision-maker audience. The Office for Coastal Management also supports the Digital Coast Partnership, which provides opportunity to leverage connections to a range of organizations working in coastal zones, including the American Planning Association, Association of State Floodplain Managers, Coastal States Organization, and the National Estuarine Research Reserve Association. This increase would also leverage information and technical assistance provided by the National Climate Data Center's Regional Climate Service Directors and Regional Climate Centers and the Climate Program Office's Regional Integrated Sciences and Assessments program.

**Schedule and Milestones:**

- Identify gaps in community-based resilience that can be most effectively addressed by Resilience Corps members (FY 2017)
- Develop and share information and best practices on resilience planning and implementation approaches implemented through Resilience Corps (FY 2017-2021)
- Identify coastal geographies to focus on for initial implementation and associated training and technical assistance (FY 2017)
- Establish cooperative agreements with coastal training partners (e.g., Sea Grant, NERRS) to provide training and technical assistance to Resilience Corps members and their sponsoring organizations in coastal communities (10-12 geographies) (FY 2017)
- Establish a Memorandum of Understanding with CNCS defining roles and responsibilities for providing training and technical assistance to Resilience Corps (2017)
- Identify lessons learned from the FY 2015/16 pilot and assess gaps in available training and identify targeted training and technical assistance needs for Resilience Corps members in each geography (10-12) (FY 2018)
- Develop resilience training curricula (in person and on-line) and begin testing with resiliency training partners (FY 2017-2018)
- Provide training (e.g., workshops, webinars, online training) and technical assistance to Resilience Corps members and their sponsoring organizations (FY 2018-2021)

- Provide targeted information on resilience tools and information (e.g., Climate Resilience Toolkit) that can be used by Resilience Corps members to support planning and implementation (FY 2018-2021)

**Deliverables:**

- Network of climate resilience training and technical assistance support professionals
- ‘Community Resilience 201’ training curricula to ensure Resilience Corps members have a consistent baseline knowledge of climate adaptation planning, risk and vulnerability assessments and other approaches to support community planning and implementation
- In-person and online training and technical assistance opportunities provided to Resilience Corps members and targeted to the needs of their projects

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Number of Resilience Corps members and partners trained (in-person and on-line) (cumulative)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	60	300	600	900	1200
<b>Without Increase</b>	0	20	40	0	0	0	0
<b>Description:</b> This measure tracks the number of Resilience Corps members and project partners who participate in trainings offered through NOAA’s network of training partners (e.g., NERRS CTP, Sea Grant, NOAA Education programs). Training will include process skills, climate content knowledge, how to use data and technical tools, and other topics as required. Volunteers may participate in more than one training event to accomplish desired level of proficiency and/or the scope of skills necessary for their assignments.							

<b>Performance Measure:</b> Percentage of U.S. coastal states and territories demonstrating 20 percent or more annual improvement in resilience capacity to weather and climate hazards (indicator 3.3g)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	66%	74%	80%	80%	80%
<b>Without Increase</b>	60%	60%	66%	71%	77%	77%	77%
<b>Description:</b> This measure tracks a range of contributions to address coastal community risk, vulnerability, and resilience to coastal hazards. It quantifies NOAA’s contributions to this important goal across NOAA’s coastal programs, measuring how NOAA is improving the Nation’s capacity for resilience to hazards and is contributing significantly to NOAA’s efforts to improve integration of its coastal programs, and expanding beyond the two coastal integration programs providing inputs to the measure (OCM and Sea Grant).							

<b>Performance Measure:</b> Number of Technical Assistance requests fulfilled to support Resilience Corps activities (Annual)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	30	60	120	120	120
<b>Without Increase</b>	0	15	15	0	0	0	0
<b>Description:</b> This measure tracks the number of successful deliveries of technical assistance for activities associated with Resilience Corps efforts. Technical assistance may include delivery of data, tools, and consultations on methods both in person and remotely. In some cases, assistance may be delivered in anticipation of an actual request.							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Program:** National Ocean Service  
**Sub-program:** Ocean and Coastal Management and Services  
**Program Change:** AmeriCorps Resilience Corps Training and Technical Assistance

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$12,827
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	12,827
12	Civilian personnel benefits	0	4,366
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	1,136
22	Transportation of things	0	20
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	926
23.3	Communications, utilities and miscellaneous charges	0	659
24	Printing and reproduction	0	9
25.1	Advisory and assistance services	500	20,157
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	376
31	Equipment	0	265
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	1,500	1,600
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	\$ 2,000	\$42,341

\* Due to financial system limitations, the object class detail for the Program reflects the full Coastal Zone Management and Services PPA.

**Coastal Zone Management and Services: Coastal Zone Management Grants (Base Funding: \$70,000,000 and 0 FTE; Program Change: +\$646,000 and 0 FTE):** NOAA requests an increase of \$646,000 and 0 FTE for a total of \$70,646,000 and 0 FTE to increase amounts available for NOAA to distribute to state CZM programs through the Coastal Zone Management Act (CZMA). States may spend these funds on a broad range of approved activities under the CZMA.

**Proposed Actions:**

NOAA requests increased funding to support the actions of state coastal zone management partners in implementing NOAA-approved CZM programs. Examples of implementation actions include improving and acquiring coastal recreation access sites, acquisition of easements for conservation and resilience purposes, development and natural infrastructure of plans and policies, and creation of waterfront plans that incorporate traditional uses into economic development proposals.

**Statement of Need and Economic Benefits:**

Funding guidance issued in 2015 identified several priorities on which funding would be focused and NOAA continues to direct resources to 1) assist communities to prepare for and respond to the impacts of changing conditions; 2) support sound ocean management; and 3) maintain and/or improve coastal water quality. Most of these issues can be expected to continue as priorities in 2017. They include 1) developing resilient coastal communities that can adapt to the impacts of hazards; 2) improving understanding of the risks of sea level rise, changes in Great Lakes hydrology and water levels, and other climate impacts.

**Resource Assessment:**

The Coastal Zone Management Act provides targeted grant funding, including through Section 306/306A and Section 309. In 2015, Section 306/306A/309 grants totaled over \$65.8 million. The Section 306/306A funds require a one-to-one match and are available to states and territories with Federally approved coastal zone management programs. States and territories that have completed Section 309 assessments are eligible for Section 309 funding, which do not require a match. There are two types of Section 309 funding: weighted formula and projects of special merit. Each year, NOAA determines how much Section 309 funding will be set aside for projects of special merit, which are awarded through a competitive process. NOAA intends to prioritize projects of special merit as it looks for new, innovative, and cost-effective ways to improve the resilience of coastal areas.

**Schedule and Milestones:**

- Develop updated funding guidance (FY 2017)
- Continue conducting the Projects of Special Merit competition for a subset of Section 309 funds (FY 2017-2021)

**Deliverables:**

- Thirty-four cooperative agreements with participating states and territories (annually) (FY 2017-2021)
- An average of 100 additional acres of key coastal habitats protected by state coastal management programs through acquisition or easement per year (FY 2017-2021)



**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Annual number of new or improved public access sites through CZM program	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	260	260	260	260	260
<b>Without Increase</b>	385	250	250	250	250	250	250
<p><b>Description:</b> The Coastal Zone Management Program helps communities provide the public with recreational access to the coast by funding projects such as walking paths to the shore; publicly owned parks, beaches, and piers; boardwalks and trails through coastal habitat such as wetlands, forests, and marshes; access to historic areas or structures such as lighthouses; and boat launches, ramps, docks, and marinas. This measure tracks the number of sites where public recreational access has been created or improved each year.</p>							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Program:** National Ocean Service  
**Sub-program:** Ocean and Coastal Management and Services  
**Program Change:** Coastal Zone Management Grants

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>0</u>	<u>0</u>
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	690
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	646	74,956
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>\$ 646</u>	<u>\$75,646</u>

**Coastal Management Grants: Regional Coastal Resilience Grants (Base Funding: \$5,000,000 and 0 FTE; Program Change: +\$15,000,000 and 0 FTE):** NOAA requests an increase of \$15,000,000 and 0 FTE for a total of \$20,000,000 and 0 FTE to expand the Regional Coastal Resilience Grants program.

**Proposed Actions:**

NOAA proposes to expand the scope and geographic reach of the Regional Coastal Resilience Grant program. Program funding at \$20,000,000 will allow NOAA to more fully support community, ecosystem, and economic resilience in all U.S. coastal regions. The initial solicitations for NOAA's resilience grants in 2015 yielded \$151 million in requests – far exceeding the available funding – indicating a significant nationwide unmet need for resilience tools and project implementation assistance.

The broad objectives of this enhanced, competitive Regional Coastal Resilience Grant (RCRG) program are threefold: 1) to increase the resilience of coastal communities by assisting them in planning for extreme weather events, coastal inundation, climate hazards, changing ocean conditions, and competing uses; 2) to support regional approaches that leverage existing efforts and promote collaboration across jurisdictions and sectors; and 3) protect, restore, and enhance habitats that increase the resilience of coastal ecosystems which, in turn, reduce hazards to communities and bolster coastal economies.

NOAA and the Federal Emergency Management Agency currently are developing a national resilience indicator framework to help communities understand their current resilience baseline and identify key information needs (e.g., ecological, social, geospatial) to track the effectiveness of resilience-building actions. In FY 2016, the national indicators framework will be completed and shared across the country. As development of the framework proceeds, this grant program will catalyze its application to guide actions for resilience efforts.

This increase will support existing efforts (for example, regional action plans addressing hazard mitigation, land use, and climate adaptation) as well as planning for and addressing data management, capacity gaps, and emerging sectors. NOAA will work with the Department of the Interior to ensure that this increase is complementary to their proposed mandatory Coastal Climate Resilience Fund, which would provide \$2 billion over 10 years for at-risk coastal states, local governments, and their communities to prepare for and adapt to climate change.

The requested increase will allow coastal communities, with technical and financial support from NOAA and its partners, to more fully address the following:

- **Develop and implement regional and community strategies that enhance preparedness, recovery, adaptation, and management.** Funds will support science-based approaches to building community resilience including the protection, restoration, or enhancement of ecosystems. Natural and hybrid infrastructure solutions – such as living shorelines and coastal wetland restoration – can have profound impacts on the resilience of a region and its infrastructure during extreme events as well as on the productivity of its fisheries. Funds also will support activities that improve the resilience of economic activities that depend on coastal and marine ecosystems and waterways.
- **Improve creation of, access to, and use of integrated regional scale information to enable risk assessments and management decisions.** Funds will support regional efforts to improve access to and use of data regarding ecosystem services and the economies that depend on them. These data are needed to help regional decision makers understand how ecosystem protection, coastal development, competing uses, and planning considerations affect regional resilience. Such data acquisition and

integration projects will complement the proposed improvements to NOAA's capabilities for ecosystem services valuation and risk assessment; NOAA will focus on national-level data while these grants will provide finer-resolution, localized data to enable regional, state, and local implementation of resilience actions.

- **Enhance technical capacity for adaptation and recovery.** Funds will help grantees build and sustain the technical capacity to adapt to environmental and socio-economic stressors, strengthen their ability to plan for and recover from extreme events, and establish resilience priorities and the ability to evaluate progress toward performance targets.

Eligible funding applicants are nonprofit and private entities, institutions of higher education, and state, territorial, tribal, and county/local governments, and regional organizations.

#### **Statement of Need and Economic Benefits:**

America's coastal communities and shorelines are facing escalating risks from changes in storm intensity, precipitation, flooding, changing sea levels, and changes in ocean ecology that can result in dramatic economic losses. Increasing population density along the coast will further intensify pressures on ecologically and economically important areas, and put more people in the path of coastal storms. Rising sea level can further escalate the costs and risks of inundation events. NOAA's National Climatic Data Center recorded 14 U.S. weather and climate-related disasters in 2011 with over \$1 billion in damages each, the highest number on record for a single year. A 2011 report by the New York State Energy Research and Development Authority warned that the combination of sea level rise and coastal surge that can accompany a powerful storm could flood much of New York City's major infrastructure, and estimated that the economic losses from a 100-year storm could range from \$58 billion to \$84 billion. The estimated \$65 billion in damages from "Superstorm" Sandy, which overwhelmed the city in October 2012, falls directly within that range and the Federal government has invested almost \$10 billion in aid to individuals, and state, local and tribal governments as well as \$450 million in hazard mitigation grants. A 2005 study by the National Institute of Building Sciences on Federal hazard mitigation grants estimated that \$1 spent on hazard mitigation potentially leads to avoidance of \$4 in disaster relief costs and lost Federal tax revenue. Smartly investing in resilience will reduce the economic impacts of these hazards and improve national economic security.

In addition to the impacts of the most extreme events, coastal flood frequency and magnitude is increasing. Recurrent flooding affects critical infrastructure, wastewater systems, freshwater supply, homes and businesses, and protective coastal habitats. NOAA projects a consistent annual 25-125 percent increase in recurrent flooding in the mid-Atlantic and parts of California. Damages from flooding range from millions to hundreds of millions per event in places like coastal Virginia. The 2014 National Climate Assessment projects increased flood frequency, hurricane-associated storm intensity and rainfall, and a 1-4 foot increase in global sea level rise. Observations above are included in the Subcommittee on Disaster Reduction's *Grand Challenges for Disaster Reduction* report as priority actions to improve capacity to recover from disasters.

Resilient coastal communities depend not only on well-designed physical infrastructure but also on industries that rely on coastal ecosystems and ocean resources. In 2013, U.S. commercial fisheries landed 9.8 billion pounds of seafood valued at \$5.5 billion; the seafood industry supported 1.7 million jobs and added \$60 billion of value to GDP; and 11 million saltwater anglers took 72 million fishing trips, contributed \$52.4 billion in sales impacts to the economy, and supported over 370,000 jobs. The loss of working waterfronts and functioning coastal

ecosystems can affect multiple sectors of the local economy. Commercial and recreational fishers, ports, harbors and other water-dependent businesses, as well as citizens seeking access to the water for recreational activities such as fishing, boating, swimming and sightseeing are losing access to these freshwater and marine resources.

Strengthening natural infrastructure and habitat condition will increase the resilience of communities and ecosystems and protect our valuable coastal economies and resources. Most decisions that affect resilience—coastal development, infrastructure and critical facilities siting, ecosystem restoration, and others—are made at the state and local levels. Therefore, NOAA's primary mechanism for advancing resilience is promoting sound decision-making through grants, information and technical assistance. Since many coastal hazard risks are common across a region, a regional approach to resilience will enable more effective implementation of best practices and successful solutions.

**Resource Assessment:**

Starting in FY 2015, NOAA has been providing \$5 million annually through Regional Coastal Resilience Grants to support actions that directly improve resilience of coastal communities. NOAA is also administering, through the National Marine Fisheries Service, the Coastal Ecosystem Resiliency Grants program to improve and restore coastal habitat such as establishing living shorelines and restoring hydrologic connections. This proposed increase for the Regional Coastal Resilience Grant Program will incorporate the scope of both existing programs and emphasize the connections between healthy habitat and the protection of communities and infrastructure.

The Department of Commerce is in the process of developing a cross-bureau resilience strategy to enhance collaboration and ensure maximum impact of related DOC efforts. The requested increase builds upon emerging connections and information resources available through collaboration with a) the Census Bureau (to facilitate the use and application of socioeconomic data holdings in community-directed vulnerability assessments); b) the National Institute of Standards and Technology (to apply their Disaster Resilience Framework to coastal communities); and c) the Economic Development Administration (to leverage opportunities for communities to most effectively use funding (including disaster recovery funds) to achieve economic resilience goals). Close coordination with key interagency efforts including the Department of Energy's Climate Action Champions program, the Department of Interior's Coastal Resilience Fund, and the Department of Housing and Urban Development's National Disaster Resilience Competition will help to minimize overlap while assisting grant recipients with access to information and technical resources.

**Schedule and Milestones:**

- Work with DOC to strengthen connections with resilience activities in Census, NIST, EDA, and provide awardees with the most up-to-date data and resources to advance resilience objectives (FY 2017-2021)
- Ensure effective connections among interagency planning, guidance, resources, and points of contact associated with Presidential Policy Directive-8 for National Preparedness (FY 2017-2021)
- Provide technical assistance to ensure that awardees are able to fully leverage existing data and decision support tools to support their resilience objectives (FY 2016-2021)

**Deliverables:**

- Published Regional Coastal Resilience Grants and Coastal Ecosystem Resiliency Grants joint FFO
- Up to 30 cooperative agreement awards to address coastal resilience objectives (FY 2017)
- 80% of coastal ecosystem resiliency projects implemented within the first year of funding award

**Performance Goals and Measurement Data:**

Performance Measure: Percentage of coastal states and territories demonstrating 20 percent or more annual improvement in resilience capacity to weather and climate hazards (indicator 3.3g)	FY 2015 Actual	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target	FY 2021 Target
<b>With Increase</b>	N/A	N/A	66%	74%	80%	80%	80%
<b>Without Increase</b>	60%	60%	66%	71%	77%	77%	77%
<p><b>Description:</b> This measure tracks a range of contributions to address coastal community risk, vulnerability, and resilience to coastal hazards. It quantifies NOAA’s contributions to this important goal across NOAA’s coastal programs, measuring how NOAA is improving the Nation’s capacity for resilience to hazards and is contributing significantly to efforts to improve integration of its coastal programs, and expanding beyond the two coastal integration programs providing inputs to the measure (Office for Coastal Management and Sea Grant).</p>							

<b>Performance Measure:</b> Number of coastal communities that complete projects to reduce future damage from or increase public awareness of hazards (with assistance from OCM funding or staff) (annual)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	75	85	95	95	95
<b>Without Increase</b>	81	70	70	70	70	70	70
<p><b>Description:</b> NOAA's Coastal Zone Management program supports state and local efforts to ensure that coastal communities are aware of and prepared for coastal hazards (e.g., flooding, coastal storms). These efforts include the development or update of local coastal hazard plans, local coastal hazard mitigation policies, ordinances or codes, technical assistance, education and outreach, and on-the-ground projects to reduce future damage from hazards.</p> <p>This measure tracks how support from NOAA programs is applied in state and local communities to achieve improvements in hazard awareness and/or preparedness. While the increased funding will begin in FY 2017, the timeline of the competition and grants cycle is such that successful applicants will not receive funds until summer 2017 so that projects funded in FY 2017 will not likely begin until FY 2018. Targets are based on the assumption that projects will be funded at the \$500K-\$1M level. Not all projects will be completed within a single year, however, which is why the number of communities does not achieve their full increase until FY 2019.</p>							

<b>Performance Measure:</b> Number of Habitat Acres Restored (Annually)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	6,300	7,800	8,000	8,000	8,000
<b>Without Increase</b>	8,414	8,522	6,300	6,800	4,400	4,000	4,000
<p><b>Description:</b> NOAA restores habitat areas lost or degraded as a result of development and other human activities, as well as specific pollution incidents and sources. Activities are geared toward NOAA trust resources found across the marine environment, including the Great Lakes region, and are supportive of anadromous species (i.e., species that migrate from the sea to freshwater to spawn). The intent of this measure is to summarize or project the geographic area over which ecosystem function has been or will be improved as the direct result of habitat restoration efforts. This measure does not include restoration conducted through the Species Recovery Grants. Examples of projects that contribute to this measure include hydrologic reconnection of wetlands, shellfish and coral reef restoration, and dam removal and fish passage.</p>							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Program:** National Ocean Service  
**Sub-program:** Ocean and Coastal Management and Services  
**Program Change:** Regional Coastal Resilience Grants

<b>Object Class</b>	<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$0
11.3 Other than full-time permanent	0	0
11.5 Other personnel compensation	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	<u>0</u>	<u>0</u>
12 Civilian personnel benefits	0	0
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	0
22 Transportation of things	0	0
23.1 Rental payments to GSA	0	0
23.2 Rental Payments to others	0	0
23.3 Communications, utilities and miscellaneous charges	0	0
24 Printing and reproduction	0	0
25.1 Advisory and assistance services	690	734
25.2 Other services	0	0
25.3 Purchases of goods & services from Gov't accounts	0	0
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	0
31 Equipment	0	0
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	14,310	89,266
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	<u>\$ 15,000</u>	<u>\$90,000</u>



**APPROPRIATION ACCOUNT: PROCUREMENT, ACQUISITION, AND CONSTRUCTION  
SUB-PROGRAM: NATIONAL OCEAN SERVICE CONSTRUCTION**

The NOS Procurement, Acquisition, and Construction account includes two program activities funded within the NOS Construction sub-program.

**National Estuarine Research Reserve System Construction**

The National Estuarine Research Reserve System (NERRS) is a Federal-state partnership established under the CZMA designed to protect and understand valuable estuarine resources through research and education. For PAC, NERRS funding is matched 70:30 (Federal: state) for facilities construction and 1:1 for land acquisition. Reserves are publicly owned lands and onsite facilities that provide opportunities for researchers as well as the public to better understand these estuarine areas. Supplementing or updating facilities at the 28 reserves is carried on in conjunction with the development of system-wide construction plans. All construction activities are based on current needs for implementing core NERRS programs and external opportunities for partnerships. When land buying opportunities are available, reserves acquire additional nearby critical habitat within, or adjacent to, a reserve boundary as identified in reserve management plans to increase protection and provide places for conducting long-term science, education, and demonstration programs. The facilities and land of the reserves are owned and managed by the states. NERRS construction and land acquisition projects are selected on a competitive basis.

**Out-year Funding Estimates (\$ in Thousands):**

<b>NERRS Construction and Land Acquisition</b>	<b>FY 2016 &amp; Prior</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC</b>	<b>Total</b>
<b>Change from FY 2017 Base</b>	-	-	-	-	-	-	-	-
<b>Total Request</b>	99,818	1,700	1,700	1,700	1,700	1,700	N/A	Recurring

**National Marine Sanctuary Program Construction**

NOAA administers the National Marine Sanctuary System under authority of the National Marine Sanctuaries Act. The Office of National Marine Sanctuaries manages and operates the Nation’s system of 13 Marine Sanctuaries and the Papahānaumokuākea Marine National Monument. The program has developed a comprehensive facilities plan that prioritizes needs and opportunities at individual sites for constructing exhibits, collaborative education and visibility projects, and operational needs. In order to establish better understanding and appreciation for sanctuary and other ocean resources by the public, the program constructed a network of exhibits, signage, and kiosks. Whenever possible, sanctuaries utilize existing aquaria, museums and other appropriate facilities to develop cooperative centers where the public and environmental decision-makers can gain direct, objective and focused information on conservation issues. These facilities serve as important windows into the resources of the Sanctuaries and act as a storefront for public interaction with NOAA programs. The goal of these exhibits is to share with the public these ocean treasures. In addition to these efforts, PAC funding supported operational facility requirements for NOAA-owned facilities, including safety improvements, Americans with Disabilities Act upgrades, and replacement and repair.

**Out-year Funding Estimates (\$ in Thousands):**

National Marine Sanctuaries Construction	FY 2016 & Prior	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	CTC	Total
Change from FY 2017 Base	-	-	-	-	-	-	-	-
Total Request	110,365	2,000	2,000	2,000	2,000	2,000	N/A	Recurring

**Schedule and Milestones:**

- Conduct national competitions for NERRS Acquisition/Construction to select projects for funding and report acres protected through the programs (FY 2017-2021)
- Conduct critical capital construction activities on Sanctuaries facilities and vessels, construction of exhibits, signage, and kiosks, and funding for limited emergency and required major small boat repairs (FY 2017-2021)

**Deliverables:**

- Financial assistance awards to state or local governments for competitively-selected projects
- Completion of ongoing projects at one of three sites: Crissy Field in San Francisco, CA, Gulf of Farallones National Marine Sanctuary, Galveston, TX, Flower Gardens Banks National Marine Sanctuary, or Scituate, MA, Stellwagen Bank National Marine Sanctuary
- Construction of exhibits, signage, and kiosks

**Performance Goals and Measurement Data:**

Performance Measure:	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Annual number of NERRS facility construction projects that improve safety or environmental sustainability	Actual	Target	Target	Target	Target	Target	Target
	7	7	7	7	7	7	7

**Description:** NERRS PAC funding is awarded for construction projects based on a competitive process. Projects must be consistent with approved reserve management plans. Projects are prioritized to address safety or inadequate facilities, improve environmental sustainability or public use/access. Recent examples of construction projects include dock and boardwalk replacements to provide safe access to reserve habitats at the Great Bay, Wells, and Chesapeake Bay, Virginia NERRS; sustainable technology at recreation and research facilities at the Mission Aransas and Weeks Bay NERRS that reduce reliance on energy and water utilities; updated exhibits at the Lake Superior, Jacques Cousteau, and Delaware NERRs that provide enhanced visitor awareness of reserve resources; and a new field station at the Rookery Bay NERR to provide dorms and enhanced access to the reserve for researchers

## **APPROPRIATION ACCOUNT: DAMAGE ASSESSMENT AND RESTORATION REVOLVING FUND**

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

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

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

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**DEPARTMENT OF COMMERCE**  
 National Oceanic and Atmospheric Administration  
 Damage Assessment and Restoration Revolving Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2016 Currently Available	16	16	5,968	152,819
less: Obligations from prior year balances	0	0	0	(1,271)
plus: Technical ATBs	0	0	0	(75,600)
FY 2017 Base	16	16	5,968	75,948
plus: program changes	0	0	0	0
FY 2017 Estimate	16	16	5,968	75,948

		FY 2015		FY 2016		FY 2017		FY 2017		Increase/Decrease	
		<u>Actual</u>		<u>Currently Available</u>		<u>Base Program</u>		<u>Estimate</u>		<u>Personnel</u>	<u>Amount</u>
Damage Assessment and Restoration Revolving Fund	Pos/BA	48	3,536	16	5,968	16	5,968	16	5,968	0	0
	FTE/OBL	48	139,439	16	152,819	16	75,948	16	75,948	0	0
Total: Damage Assessment and Restoration Revolving Fund	Pos/BA	48	3,536	16	5,968	16	5,968	16	5,968	0	0
	FTE/OBL	48	139,439	16	152,819	16	75,948	16	75,948	0	0

**DEPARTMENT OF COMMERCE**  
National Oceanic and Atmospheric Administration  
Damage Assessment and Restoration Revolving Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
(Dollar amounts in thousands)

	FY 2015		FY 2016		FY 2017		FY 2017		Increase/ Decrease	
	<u>Actual</u>		<u>Currently Available</u>		<u>Base Program</u>		<u>Estimate</u>		<u>Decrease</u>	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Mandatory Obligation	48	139,439	16	152,819	16	75,948	16	75,948	0	0
Total Obligations	48	139,439	16	152,819	16	75,948	16	75,948	0	0
<i>Adjustments to Obligations:</i>										
Federal funds	0	1,304	0	0	0	0	0	0	0	0
Offsetting collections, mandatory	0	(141,173)	0	(85,600)	0	(10,000)	0	(10,000)	0	0
Adjustment of unobligated balance brought forward	0	(351)	0	0	0	0	0	0	0	0
Recoveries	0	(51,247)	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	(110,939)	0	(166,460)	0	(111,209)	0	(111,209)	0	0
Unobligated balance transferred (from DOI)	0	0	0	(6,000)	0	(6,000)	0	(6,000)	0	0
Unobligated balance, transferred (to ORF)	0	43	0	0	0	0	0	0	0	0
Unobligated balance, unapportioned	0	10,022	0	0	0	0	0	0	0	0
Unobligated balance, EOY	0	156,438	0	111,209	0	57,229	0	57,229	0	0
Total Budget Authority	48	3,536	16	5,968	16	5,968	16	5,968	0	0
<i>Financing from Transfers:</i>										
Appropriation (previously unavailable)	0	(225)	0	(406)	0	(406)	0	(406)	0	0
Transfer from DOI – CY	0	(3,717)	0	(5,968)	0	(5,968)	0	(5,968)	0	0
Appropriation temporarily reduced*	0	406	0	406	0	406	0	406	0	0
Net Appropriation	48	0	16	0	16	0	16	0	0	0

**DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
**Damage Assessment and Restoration Revolving Fund**  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

Object Class	FY 2015 Actual	FY 2016 Currently Available	FY 2017 Base Program	FY 2017 Estimate	Increase/ Decrease
11	Personnel compensation				
11.1	5,381	1,856	1,885	1,885	0
11.3	838	918	933	933	0
11.7	0	0	0	0	0
11.8	0	0	0	0	0
11.9	6,219	2,774	2,818	2,818	0
12.1	1,753	654	665	665	0
12.2	6	7	7	7	0
21	1,051	1,152	1,152	1,152	0
22	49	54	54	54	0
23.1	136	149	149	149	0
23.2	6	6	6	6	0
23.3	54	59	59	59	0
24	7	8	8	8	0
25.1	1,331	1,458	1,458	1,458	0
25.2	282	309	309	309	0
25.3	88,172	137,892	60,956	60,956	0
26	587	643	643	643	0
31	238	261	261	261	0
41	6,714	7,359	7,358	7,358	0
42	31	34	34	34	0
43	3	0	0	0	0
44	32,800	0	0	0	0
99	139,439	152,819	75,948	75,948	0

**DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
**Damage Assessment and Restoration Revolving Fund**  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

	FY 2015 Actual	FY 2016 Currently Available	FY 2017 Base Program	FY 2017 Estimate	Increase/ Decrease
Federal Funds	1,304	0	0	0	0
Less collections	(141,173)	(85,600)	(10,000)	(10,000)	0
Less Recoveries	(51,247)	0	0	0	0
Less adjustment of unobligated balance brought forward	(351)	(0)	(0)	(0)	0
Less unobligated balance, SOY	(110,939)	(166,460)	(111,209)	(111,209)	0
Plus unobligated balance transferred	43	(6,000)	(6,000)	(6,000)	0
Plus unobligated balance, unapportioned	10,022	0	0	0	0
Plus unobligated balance, EOY	156,438	111,210	57,230	57,230	0
<b>Total Budget Authority</b>	<b>3,536</b>	<b>5,968</b>	<b>5,968</b>	<b>5,968</b>	<b>0</b>
Transfers:					
Appropriation previously unavailable	(255)	(406)	(406)	(406)	
Transfer from DOI	(3,717)	(5,968)	(5,968)	(5,968)	0
Appropriation temporarily reduced	406	406	406	406	0
<b>Net Appropriation</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Personnel Data</b>					
Full-Time equivalent Employment:					
Full-time permanent	48	16		16	0
Other than full time permanent	0	0		0	0
<b>Total</b>	<b>48</b>	<b>16</b>		<b>16</b>	<b>0</b>
Authorized Positions:					
Full-time permanent	48	16		16	0
Other than full time permanent	0	0		0	0
<b>Total</b>	<b>48</b>	<b>16</b>		<b>16</b>	<b>0</b>



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

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

	Positions	FTE	Budget Authority	Direct Obligations
FY 2016 Currently Available	0	0	125	392
less: Obligations from prior year balances	0	0	0	0
plus: Technical ATBs	0	0	(5)	(272)
FY 2017 Base	0	0	120	120
plus: program changes	0	0	0	0
FY 2017 Estimate	0	0	120	120

		FY 2015		FY 2016		FY 2017 Base		FY 2017		Increase/Decrease	
		Actual	Amount	Currently Available	Amount	Program	Amount	Estimate	Amount	Personnel	Amount
Sanctuaries Enforcement Asset Forfeiture Fund	Pos/BA	0	(4)	0	125	0	120	0	120	0	0
	FTE/OBL	0	86	0	392	0	120	0	120	0	0
Total: Sanctuaries Enforcement Asset Forfeiture Fund	Pos/BA	0	(4)	0	125	0	120	0	120	0	0
	FTE/OBL	0	86	0	392	0	120	0	120	0	0

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

	FY 2015		FY 2016		FY 2017		FY 2017		Increase/ Decrease	
	<u>Actual</u>		<u>Currently Available</u>		<u>Base Program</u>		<u>Estimate</u>			
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Mandatory Obligation	0	86	0	392	0	120	0	120	0	0
Total Obligations	0	86	0	392	0	120	0	120	0	0
<i>Adjustments to Obligations:</i>										
Recoveries	0	(66)	0	0	0	0	0	0	0	0
Unobligated balance, SOY	0	(216)	0	(267)	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	(69)	0	0	0	0	0	0	0	0
Unobligated balance, transferred	0	(5)	0	0	0	0	0	0	0	0
Unobligated balance, EOY	0	200	0	0	0	0	0	0	0	0
Unobligated balance, unapportioned	0	66	0	0	0	0	0	0	0	0
Total Budget Authority	0	(4)	0	125	0	120	0	120	0	0
<i>Financing from Transfers:</i>										
Mandatory Appropriation	0	(7)	0	(120)	0	(120)	0	(120)	0	0
Appropriation previously unavailable	0	(3)	0	(14)	0	(8)	0	(8)	0	0
Appropriation temporarily reduced	0	14	0	8	0	8	0	8	0	0
Net Appropriation	0	7	0	120	0	120	0	120	0	0

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

Object Class	FY 2015 Actual	FY 2016 Currently Available	FY 2017 Base Program	FY 2017 Estimate	Increase/ Decrease
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full time permanent	0	0	0	0	0
11.2 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel Benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	2	10	3	3	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
24 Printing and reproduction	2	9	3	3	0
25.1 Advisory and assistance services	0	0	0	0	0
25.2 Other services	1	3	1	1	0
25.3 Purchases of goods and services from Gov't accounts	21	93	29	29	0
26 Supplies and materials	60	277	84	84	0
31 Equipment	0	0	0	0	0
41 Grants, subsidies and contributions	0	0	0	0	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
99 Total Obligations	86	392	120	120	0

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

	FY 2015 Actual	FY 2016 Currently Available	FY 2017 Base Program	FY 2017 Estimate	Increase/ Decrease
Less recoveries	(66)	0	0	0	0
Less unobligated balance, SOY	(216)	(266)	0	0	0
Less unobligated balance, adj SOY	(69)	0	0	0	0
Less unobligated balance, transferred	(5)	0	0	0	0
Plus unobligated balance, EOY	200	0	0	0	0
Plus unobligated balance, unapportioned	66	0	0	0	0
<b>Total Budget Authority</b>	<b>(4)</b>	<b>125</b>	<b>120</b>	<b>120</b>	<b>0</b>
Transfers:					
Mandatory Appropriation	0	0	0	0	0
Appropriation previously unavailable	(3)	(13)	(8)	(8)	0
Appropriation temporarily reduced	14	8	8	8	0
<b>Mandatory Appropriation</b>	<b>7</b>	<b>120</b>	<b>120</b>	<b>120</b>	<b>0</b>

**APPROPRIATION ACCOUNT: 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 Science Program. The purpose of this program is to initiate and sustain an integrative, holistic understanding of the Gulf of Mexico ecosystem and support, to the maximum extent practicable, restoration efforts and the long-term sustainability of the ecosystem, including its fish stocks, fishing industries, habitat, and wildlife through ecosystem research, observation, monitoring, and technology development.

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

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

	Positions	FTE	Budget Authority	Direct Obligations
FY 2016 Currently Available	1	1	0	354
less: Obligations from prior year balances	0	0	0	0
plus: Technical ATBs	0	0	0	5,362
FY 2017 Base	1	1	0	5,716
plus: program changes	0	0	0	0
FY 2017 Estimate	1	1	0	5,716

		<u>FY 2015 Actual</u>		<u>FY 2016 Currently Available</u>		<u>FY 2017 Base Program</u>		<u>FY 2017 Estimate</u>		<u>Increase/ (Decrease)</u>	
		Personnel Amount		Personnel Amount		Personnel Amount		Personnel Amount		Personnel Amount	
Gulf Coast	Pos/BA	1	0	1	0	1	0	1	0	0	0
Restoration Fund	FTE/OBL	1	2,976	1	464	1	5,716	1	5,716	0	0
Total: Gulf Coast	Pos/BA	1	0	1	0	1	0	1	0	0	0
Restoration Fund	FTE/OBL	1	2,976	1	464	1	5,716	1	5,716	0	0

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

	FY 2015		FY 2016		FY 2017		FY 2017		Increase/	
	<u>Actual</u>		<u>Currently Available</u>		<u>Base Program</u>		<u>Estimate</u>		<u>Decrease</u>	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Mandatory Obligation	0	2,976	0	464	0	5,716	0	5,716	0	0
Total Obligations	0	2,976	0	464	0	5,716	0	5,716	0	0
<i>Adjustments to Obligations:</i>										
New offsetting collections	0	(3,087)	0	(353)	0	(5,716)	0	(5,716)	0	0
Unobligated balance, adj. SOY	0	0	0	(111)	0	0	0	0	0	0
Unobligated balance, EOY	0	111	0	0	0	0	0	0	0	0
Total Budget Authority	0	0	0	0	0	0	0	0	0	0
<i>Financing from Transfers:</i>										
Transfer from Other Accounts	0	0	0	0	0	0	0	0	0	0
Appropriation temporarily reduced	0	0	0	0	0	0	0	0	0	0
Net Appropriation	0	0	0	0	0	0	0	0	0	0

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

Object Class	FY 2015 Actual	FY 2016 Currently Available	FY 2017 Base Program	FY 2017 Estimate	Increase/ Decrease
11 Personnel compensation					
11.1 Full-time permanent	92	93	95	95	0
11.3 Other than full time permanent	0	0	0	0	0
11.2 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	92	93	95	95	0
12.1 Civilian personnel Benefits	35	35	36	36	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	35	6	68	68	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
25.1 Advisory and assistance services	0	0	0	0	0
25.2 Other services	0	0	0	0	0
25.3 Other purchases of goods and services from Gov't accounts	212	33	405	405	0
26 Supplies and materials	0	0	1	1	0
31 Equipment	2	0	4	4	0
41 Grants, subsidies and contributions	2,600	297	5,107	5,107	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
99 Total Obligations	2,976	464	5,716	5,716	0

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

	FY 2015 Actual	FY 2016 Currently Available	FY 2017 Base Program	FY 2017 Estimate	Increase/ Decrease
Federal Funds	0	0	0	0	0
Less offsetting collections	(3,087)	(353)	(5,716)	(5,716)	0
Less unobligated balance, SOY	0	111	0	0	0
Plus unobligated balance, EOY	111	0	0	0	0
Plus unobligated balance transferred	0	0	0	0	0
Total Budget Authority	0	0	0	0	0
Transfers:					
Transfers from Other Accounts	0	0	0	0	0
Appropriation temporarily reduced	0	0	0	0	0
Mandatory Budget Authority	0	0	0	0	0

## **APPROPRIATION ACCOUNT: NATIONAL OCEANS AND COASTAL SECURITY FUND**

This purpose of the Fund is to 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. This funding seeks to contribute to the outcome that present and future generations will benefit from the full range of environmental, economic, and cultural services that ocean and coastal resources are capable of providing. NOAA will partner with the National Fish and Wildlife Foundation to establish the tax-exempt fund to further the purposes of Title IX of the Consolidated Appropriations Act, 2016. Grants will be awarded by the Foundation, in coordination with NOAA, per specific eligibility criteria. Broadly, grants support protection, conservation, and restoration of ocean and coastal resources and coastal infrastructure.

## **PROGRAM CHANGES FOR FY 2017:**

**National Oceans and Coastal Security Fund: (Base funding: \$0 and 0 FTE; Program Change: +\$10,000,000, and +1 FTE):** NOAA requests an increase of \$10,000,000 and 1 FTE for a total of \$10,000,000 and 1 FTE for activities under the National Oceans and Coastal Security Fund (Fund) as authorized by Title IX of the “Consolidated Appropriations Act, 2016.”

### **Proposed Actions:**

This purpose of the Fund is to 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.

NOAA will partner with the National Fish and Wildlife Foundation to award grants to Coastal States and for National Grants for Oceans, Coasts, and Great Lakes. Grants will support programs and activities intended to protect, conserve, and restore ocean and coastal resources and coastal infrastructure, including baseline scientific research, ocean observing, and other programs and activities carried out in coordination with Federal and state departments or agencies.

NOAA and the Foundation will develop specific priorities and criteria that will guide each year’s grant applications and awards of funding. NOAA will provide for public review and comment prior to finalizing each year’s priorities and criteria.

Once criteria and priorities are finalized, the Administrator and the Foundation may award grants to support activities that align with identified priorities. Potential funding priorities will vary from year-to-year, but may include the following:

- Efforts that contribute to the understanding of ecological, economic, and societal threats faced by changes to the oceans, coasts, and Great Lakes.
- Efforts to better understand the various services that coastal, ocean, and Great Lakes ecosystems provide including ways to maximize resilience and sustainability of those services through different management approaches such as habitat restoration, shoreline protection and stabilization, harmful algal bloom control, and Marine Protected Areas.
- Restoration, protection, or maintenance of living ocean, coastal, and Great Lakes resources and their habitats, including efforts to address potential impacts of sea or water level change, inundation, changes in ocean chemistry, harmful algal blooms, and changes in ocean temperature.
- Planning for and managing coastal development to enhance ecosystem integrity or minimize impacts from sea level change and coastal erosion.
- The use of natural infrastructure to maximize multiple benefits and services.

The program will consist of direct grants to “coastal states” and “national grants” that may be awarded to a range of recipients, including states, local governments, tribes, associations, nongovernmental organizations, public-private partnerships, and academic institutions. Each year, NOAA, in consultation with the Foundation, will decide the amount of appropriated funds that will be directed to coastal states and how much will be directed to national grants.

**Statement of Need and Economic Benefits:**

One of every six jobs in the United States is marine-related and over one-third of the U.S. Gross National Product originates in coastal areas. In 2012, U.S. commercial fisheries landed 9.6 billion pounds of seafood valued at \$5.1 billion; the seafood industry supported 1.3 million jobs and added \$59 billion to GDP; and saltwater anglers took 72 million fishing trips, contributed \$58 billion to the economy, and supported over 381,000 jobs. The resilience of coastal infrastructure and ecosystems are essential to ensure the continuity of these economic benefits.

However, growing coastal populations and competition for marine space and resources heavily stress ocean, coastal and Great Lakes resources. Impacts are significant and varied: chemical, physical, and biological changes in the oceans and overfishing, habitat destruction, invasive species, and pollution contribute to the decline of fish, marine mammals, and protected species as well as reduce the biological diversity of marine ecosystems. Changing global climate conditions continue to impact ocean temperature, salinity, sea level, and circulation patterns that affect the vitality and presence of marine and terrestrial life.

Within the context of these changes, human population – especially along the coast – continues to increase as does its demand for goods and services provided by the Nation's waters. The complex interdependence of ecosystems and economies continues to grow with increasing uses of land, marine, and coastal resources, resulting in particularly heavy economic and environmental pressures on the Nation's coastal communities.

Further, America's coastal communities and shorelines face increasingly frequent and intense extreme weather events, causing dangerous conditions and dramatic economic losses. Increasing population density along the coast puts more people in the path of coastal storms. NOAA's National Climatic Data Center recorded 14 U.S. weather and climate-related disasters in 2011 with over \$1 billion in damages each, the highest number on record for a single year.

These challenges convey a common message: human health, prosperity, and well-being depend upon the health and resilience of coupled natural and social ecosystems. Managing this interdependence requires timely and usable information to make decisions and the science that underpins knowledge of these systems. Meeting the increasing demand for NOAA's science and services addresses the many challenges facing the ocean, coasts, and Great Lakes and supports the entire Nation in its dependence of them.

**Resource Assessment:**

This is a newly established fund and does not have prior funding.

**Schedule and Milestones:**

FY 2017:

- Complete MOA Annex for administration of the Fund
- Develop criteria and procedures for administration of the Fund and allocation of awards
- Develop and issue for public comment the initial set of priorities for the first year's awards
- Competitively select and fund selected initial projects

FY 2017 - 2021:

- Competitively select and fund projects
- Conduct semi-annual reviews of funded projects
- Monitor projects status
- Develop and issue Annual Reports

**Deliverables:**

- MOA Annex
- Establishment of Fund
- Procedures and Criteria

**Performance Goals and Measurement Data:**

Specific performance measures will be developed as criteria and priorities are finalized.



**PROGRAM CHANGE PERSONNEL DETAIL**

**Program:** National Ocean Service  
**Sub-program:** Ocean and Coastal Management and Services  
**Program Change:** National Oceans and Coastal Security Fund

<b>Title:</b>	<b>Location</b>	<b>Grade</b>	<b>Number of Positions</b>	<b>Annual Salary</b>	<b>Total Salaries</b>
Program Analyst	Silver Spring, MD	ZA-IV	<u>1</u>	92145	<u>92,145</u>
<b>Total</b>			<u>1</u>		<u>92,145</u>
less Lapse (25%)		0%	<u>0</u>		<u>(23,036)</u>
Total full-time permanent (FTE)			1		69,109
2017 Pay Adjustment (1.6%)					<u>1,106</u>
TOTAL					70,215
<b>Personnel Data</b>			<u>Number</u>		
Full-Time Equivalent Employment					
Full-time permanent			1		
Other than full-time permanent			<u>0</u>		
Total			1		
Authorized Positions:					
Full-time permanent			1		
Other than full-time permanent			<u>0</u>		
Total			1		

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Program:** National Ocean Service  
**Sub-program:** Ocean and Coastal Management and Services  
**Program Change:** National Oceans and Coastal Security Fund

<b>Object Class</b>	<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11 Personnel compensation		
11.1 Full-time permanent	\$70	\$70
11.3 Other than full-time permanent	0	0
11.5 Other personnel compensation	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	70	70
12 Civilian personnel benefits	26	26
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	5	5
22 Transportation of things	0	0
23.1 Rental payments to GSA	0	0
23.2 Rental Payments to others	0	0
23.3 Communications, utilities and miscellaneous charges	0	0
24 Printing and reproduction	0	0
25.1 Advisory and assistance services	0	0
25.2 Other services	0	0
25.3 Purchases of goods & services from Gov't accounts	0	0
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	0
31 Equipment	0	0
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	9,899	9,899
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	\$ 10,000	\$10,000

**DEPARTMENT OF COMMERCE**  
 National Oceanic and Atmospheric Administration  
 National Oceans and Coastal Securities Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2016 Currently Available	0	0	0	0
less: Obligations from prior year balances	0	0	0	0
plus: Technical ATBs	0	0	0	0
FY 2017 Base	0	0	0	0
plus: program changes	1	1	10,000	10,000
FY 2017 Estimate	1	1	10,000	10,000

		FY 2015 <u>Actual</u>	FY 2016 <u>Currently Available</u>	FY 2017 <u>Base Program</u>	FY 2017 <u>Estimate</u>	Increase/ <u>(Decrease)</u>
		Personnel	Amount	Personnel	Amount	Personnel
National Oceans and Coastal Security Fund	Pos/BA	0	0	0	0	1 10,000
	FTE/OBL	0	0	0	0	1 10,000
National Oceans and Coastal Security Fund	Pos/BA	0	0	0	0	1 10,000
	FTE/OBL	0	0	0	0	1 10,000

**DEPARTMENT OF COMMERCE**  
 National Oceanic and Atmospheric Administration  
 National Oceans and Coastal Securities Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	FY 2015		FY 2016		FY 2017		FY 2017		Increase/	
	<u>Actual</u>		<u>Currently Available</u>		<u>Base Program</u>		<u>Estimate</u>		<u>Decrease</u>	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligations	0	0	0	0	0	0	1	10,000	1	10,000
Total Obligations	0	0	0	0	0	0	1	10,000	1	10,000
<i>Adjustments to Obligations:</i>										
New offsetting collections	0	0	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	0	0	0	0	0	0	0	0	0
Unobligated balance, EOY	0	0	0	0	0	0	0	0	0	0
Total Budget Authority	0	0	0	0	0	0	1	10,000	1	10,000
<i>Financing from Transfers:</i>										
Transfer from Other Accounts	0	0	0	0	0	0	0	0	0	0
Appropriation temporarily reduced	0	0	0	0	0	0	0	0	0	0
Net Appropriation	0	0	0	0	0	0	1	10,000	1	10,000

**DEPARTMENT OF COMMERCE**  
 National Oceanic and Atmospheric Administration  
 National Oceans and Coastal Securities Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

Object Class	FY 2015 Actual	FY 2016 Currently Available	FY 2017 Base Program	FY 2017 Estimate	Increase/ Decrease
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	92	92
11.3 Other than full time permanent	0	0	0	0	0
11.2 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	92	92
12.1 Civilian personnel Benefits	0	0	0	26	26
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	53	53
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
25.1 Advisory and assistance services	0	0	0	0	0
25.2 Other services	0	0	0	0	0
25.3 Other purchases of goods and services from Gov't accounts	0	0	0	0	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
41 Grants, subsidies and contributions	0	0	0	9,829	9,829
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
99 Total Obligations	0	0	0	10,000	10,000

**DEPARTMENT OF COMMERCE**  
 National Oceanic and Atmospheric Administration  
 National Oceans and Coastal Securities Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	FY 2015 Actual	FY 2016 Currently Available	FY 2017 Base Program	FY 2017 Estimate	Increase/ Decrease
Federal Funds	0	0	0	0	0
Less collections	0	0	0	0	0
Less unobligated balance, SOY	0	0	0	0	0
Plus unobligated balance, EOY	0	0	0	0	0
Plus unobligated balance transferred	0	0	0	0	0
<b>Total Budget Authority</b>	0	0	0	10,000	10,000
Transfers:					
Transfers from Other Accounts	0	0	0	0	0
Appropriation temporarily reduced	0	0	0	0	0
<b>Net Appropriation</b>	0	0	0	10,000	10,000

## **BUDGET PROGRAM: NATIONAL MARINE FISHERIES SERVICE**

For FY 2017, NOAA requests a total of \$1,015,930,000 and 2,986 FTE for the National Marine Fisheries Service, including a net increase of \$51,786,000 and 38 FTE in program changes.

### **National Marine Fisheries Service Overview**

NOAA's National Marine Fisheries Service (NMFS) is responsible for the management and conservation of living marine resources within the U.S. Exclusive Economic Zone (EEZ)—the area extending from three to 200 nautical miles offshore. NMFS provides critical support to commercial and recreational marine fisheries and aquaculture industries, which contribute more than \$89 billion annually to the national economy, generate \$195 billion in sales impact, and support over 1.7 million jobs economy-wide<sup>1</sup>. NMFS also provides scientific and policy leadership in the international arena, and plays a key role in the management of living marine resources in coastal areas under state jurisdiction.

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

The NMFS budget is organized into four sub-programs under the Operations, Research, and Facilities appropriation account (\$861,948,000 and 2,908 FTE):

- Protected Resources Science and Management (\$184,969,000 and 811 FTE) includes Marine Mammals, Sea Turtles and Other Species; Species Recovery Grants; Atlantic Salmon; and Pacific Salmon.
- Fisheries Science and Management (\$545,226,000 and 1,706 FTE) includes Fisheries and Ecosystem Science Programs and Services; Fisheries Data Collections, Surveys, and Assessments; Observers and Training; Fisheries Management Programs and Services; Aquaculture; Salmon Management Activities; Regional Councils and Fisheries Commissions; and Interjurisdictional Fisheries Grants.
- Enforcement (\$69,840,000 and 237 FTE).
- Habitat Conservation and Restoration (\$61,913,000 and 154 FTE).

The NMFS budget includes the following other accounts:

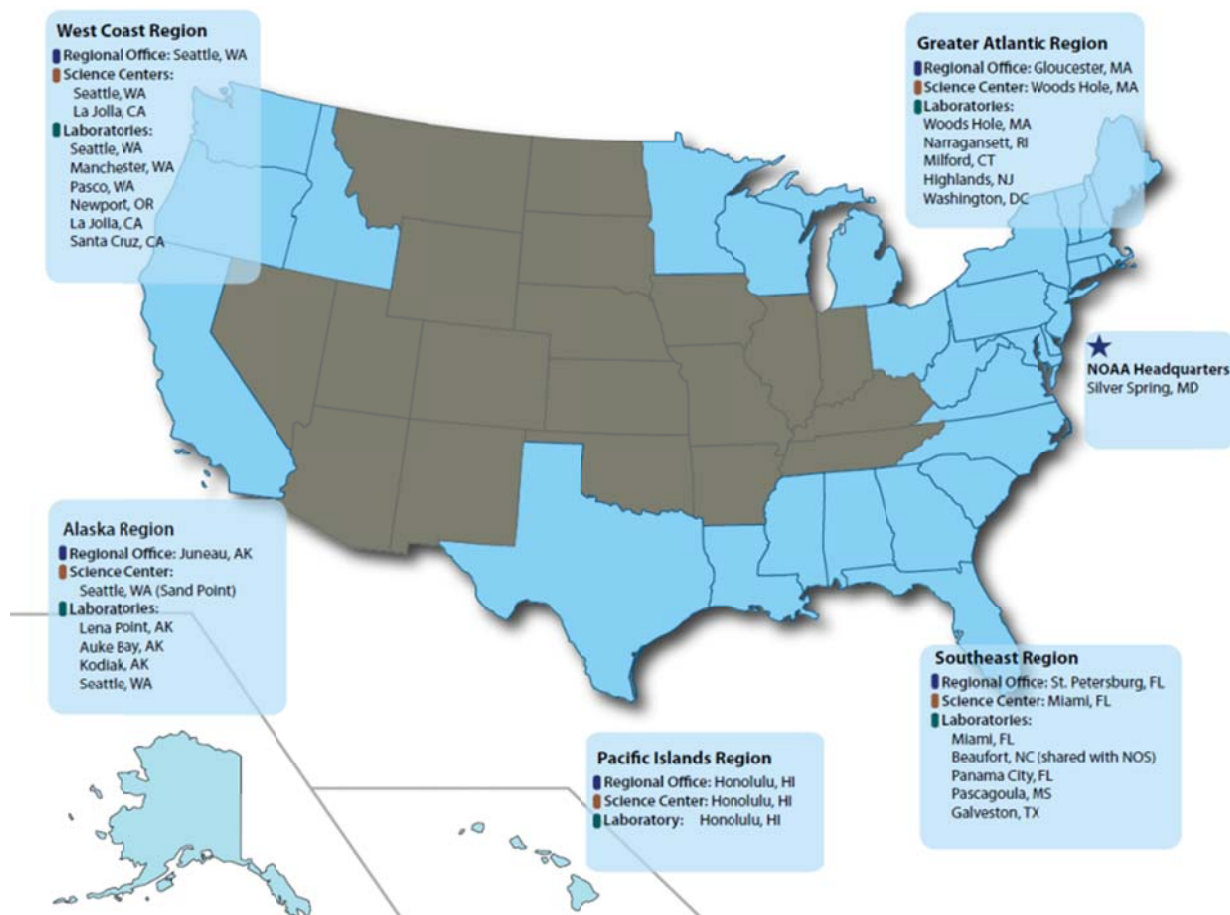
- Pacific Coastal Salmon Recovery Fund
- Fisheries Disaster Assistance Fund
- Fishermen's Contingency Fund
- Foreign Fishing Observer Fund

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<sup>1</sup> [www.st.nmfs.noaa.gov/economics/publications/feus/FEUS-2013/fisheries\\_economics\\_2013](http://www.st.nmfs.noaa.gov/economics/publications/feus/FEUS-2013/fisheries_economics_2013)

- Fisheries Finance Program Account
- Promote and Develop American Fishery Products & Research Pertaining to American Fisheries, which includes Saltonstall-Kennedy (S-K) Funds
- Federal Ship Financing Fund
- Environmental Improvement and Restoration Fund
- Limited Access System Administration Fund
- Marine Mammal Unusual Mortality Event Fund
- Western Pacific Sustainable Fisheries Fund
- Fisheries Asset Forfeiture Fund
- North Pacific Observer Fund

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





**Significant Inflationary Adjustments:**

NOAA's FY 2017 Base includes a total of \$9,859,000 and 5 FTE to account for the full funding requirement for inflationary adjustments to current programs for NMFS activities. This includes the estimated 2017 Federal pay raise of 1.6 percent as well as inflationary increases for non-labor activities, including service contracts, utilities, field office lease payments, and rent charges from the General Services Administration (GSA).

NOAA also requests the following transfer for a net change of \$0 and 0 FTE to the agency:

<b>From Office</b>	<b>PPA</b>	<b>To Office</b>	<b>PPA</b>	<b>Amount/FTE</b>
MS	Mission Services and Management	NMFS	Fisheries and Ecosystem Science Programs and Services	\$2,098,000/0 FTE
MS	Mission Services and Management	NMFS	Fisheries Management Programs and Services	\$379,000/0 FTE
MS	Mission Services and Management	NMFS	Enforcement	\$73,000/0 FTE
MS	Mission Services and Management	NMFS	Habitat Conservation and Restoration	\$42,000/0 FTE
			Total:	\$2,592,000/0 FTE

NOAA requests to transfer \$2,592,000 and 0 FTE to move funding associated with NOAA's Western Regional Center (WRC) management activities from Mission Support Facilities to NMFS. Currently, costs for these activities are paid directly through the funding appropriated to the Mission Services and Management PPA. This reallocation supports NOAA's plan to employ an integrated campus cost model to allocate the cost of services provided to the WRC tenants. The tenants will then be billed directly based on the approved cost model. An integrated cost model will provide greater transparency and a more accurate reflection of program operating costs.

**APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES  
SUB-PROGRAM: PROTECTED RESOURCES SCIENCE AND MANAGEMENT**

The mission of the Protected Resources Science and Management sub-program is to assess, understand, and protect the health of protected species, the ecosystems that sustain them, and the communities that value and depend on them. The program, in partnership with internal and external stakeholders, uses best available science to develop and implement best practices and conservation actions to reduce threats to protected species and their marine and coastal ecosystems. Protected species include those listed under the Endangered Species Act (ESA) and marine mammals covered by the Marine Mammal Protection Act (MMPA).

NMFS implements the ESA and MMPA with the U.S. Fish and Wildlife Service (USFWS). In general, USFWS is responsible for the conservation of terrestrial and freshwater aquatic organisms, some marine mammals, and marine turtles on their nesting beaches. NMFS is responsible for the conservation of most marine mammals, most marine and anadromous fish (i.e., fish that migrate from the sea to fresh water to spawn), marine turtles at sea, marine invertebrates (including corals), and marine plants. In addition, the Marine Mammal Commission provides oversight and makes recommendations to NMFS on priority marine mammal issues, and three regional Scientific Review Groups provide independent review of our marine mammal stock assessments.

Programs related to protected species are administered through the following budget line items:

**Marine Mammals, Sea Turtles, and Other Species**

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

In FY 2015, NMFS introduced the “Species in the Spotlight: Survive to Thrive” initiative, an innovative approach to marshal public and private support to slow, halt, and reverse the population decline of eight of our most endangered species—Hawaiian monk seals, southern resident killer whales, white abalone, Cook Inlet beluga whales, Atlantic salmon, Pacific leatherback turtles, Sacramento River winter-run Chinook, and Central California Coast coho. Our approach involves targeted and intensive human efforts to stabilize these species, with the goal that they will achieve recovery.

Major components of this budget line include:

*Listing (ESA Section 4)*: Any U.S. citizen or organization may petition NMFS to list a species as threatened or endangered, reclassify an already listed species, or revise designated critical habitat under the ESA. Once a petition is received, the ESA outlines deadlines that must be met, including 90 days for an initial determination and 12 months for determining whether the listing or reclassification is warranted. If warranted, NMFS must publish a proposed rule to list the species. NMFS then considers public comments and any new information that might become available and must publish a final determination within one year after the date of publishing the proposed rule. The ESA also requires that critical habitat be designated concurrently with the final listing.

Once a species is listed, NMFS is required to develop a recovery plan and implement the protections of the ESA. When a species is listed as endangered, the ESA prohibits any take of the species, with specific exceptions. However, if the species is listed as threatened, NMFS must issue separate protective regulations under ESA Section 4(d) in order to specify the prohibitions against harming the species.

Recovery (ESA Section 4): The ESA requires NMFS to use all methods and procedures to bring listed species to the point where the protections of the ESA are no longer necessary. Recovery is the process of conserving these species and ecosystems as well as ensuring that listed species remain functioning members of the ecosystems we all depend upon. Actions taken to recover these species provide communities with healthier ecosystems, cleaner water, greater opportunities for recreation, and the opportunity for current and future generations to share the benefits of diverse and healthy natural resources. Actions to achieve species recovery may require one or more of the following:

- restoring or preserving habitat;
- minimizing or offsetting threats to species; and/or
- enhancing population numbers.

In FY 2015, NMFS created the Interagency Agreement to Protect Corals in the Port of Miami. This agreement with the U.S. Army Corps of Engineers supports the emergency relocation of ESA protected corals impacted by a Miami harbor deepening project. Several hundred branches of threatened staghorn corals impacted by sediment burial were salvaged, transplanted in nurseries, and out-planted in undisturbed reef areas.

Species Stock Assessment and Monitoring (ESA Section 4, MMPA Sections 115 and 117): This program supports protected species stock assessment and monitoring activities using a variety of observation and survey methods, including use of marine acoustics, unmanned systems, surveys (ship, aerial, and shore-based), and telemetry. To adequately support management decisions, assessments are comprehensive and include estimates of abundance and distribution; and analysis of historical trends, serious injury and mortality levels, life history and demographics, and impacts of human activities (e.g., noise, climate, habitat, and ecosystem change). Collection of these basic assessment data enable NMFS to be as targeted as possible in prescribing mitigation measures that affect commercial and recreational activities.

Research (ESA Section 4, MMPA Sections 115 and 117): NMFS conducts research to inform conservation and management actions, focusing on the biology, behavior, and health of marine mammal species; genetic differentiation; ecosystem interactions; and effects of human activities on the recovery and conservation of protected species. Effective conservation requires understanding how human and natural factors influence the viability of marine species and their ecosystems.

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

In FY 2015, NOAA completed the Essential Fish Habitat and Endangered Species Act consultations for the Port of Charleston in South Carolina, in time to avoid delays in the U.S. Army Corps of Engineers (USACE) authorization and approval process. This port is one of four in the Southeast Region in the Administration's *We Can't Wait* harbor deepening initiative and is needed to accommodate much larger vessels scheduled to arrive once the Panama Canal expansion is completed in 2016.

Upon completion, the \$700 million, 288-acre marine terminal will include areas to check, process, store, and transport incoming cargo. NOAA's early engagement with the USACE, Ports Authority, and other environmental and permitting agencies, ensured the project incorporated best management practices to lessen impacts on trust resources during port construction. It also helped shape the development of the Ports Authority's mitigation plan, which includes tidal marsh, oyster, and other habitat restoration, to offset the environmental impacts of the project. NMFS staff will continue to work with the Ports Authority and others to adaptively manage and monitor the results of the mitigation plan.

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

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

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

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

*Marine Mammal Health and Stranding Response Program (MMPA Title IV):* NMFS is the lead Federal agency to coordinate marine mammal stranding networks, responses, and investigations of marine mammal mortality events.

**Species Recovery Grants (ESA Section 6):** Recovery and conservation actions for listed species under NMFS jurisdiction are implemented through Species Recovery Grants, which are awarded to states and Tribes. For listed species, funding supports activities such as reducing or removing significant sources of mortality and injury, assessing and monitoring

species status and trends, developing conservation plans, conserving habitat, and engaging the public in conservation efforts. Funding may also support monitoring of candidate species and recently de-listed species.

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

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

#### **Schedule and Milestones:**

FY 2017–2021

- Review listing petitions and issue 90-day findings, conduct ESA status reviews and issue 12-month findings, and promulgate ESA protective regulations
- Prepare recovery plans and implement recovery actions identified in the plans to improve the status of ESA-listed species
- Designate critical habitat
- Provide technical assistance, consultation, and authorization services for all Federal agencies' proposed actions (ESA Section 7)
- Continue development and implementation of 10 Take Reduction Teams (TRTs) to achieve MMPA goals through increased compliance monitoring and bycatch assessments
- Evaluate effectiveness and recommend enforcement measures, modify existing regulations, and add protective measures to reduce marine mammal bycatch in fisheries
- Conduct comprehensive protected species stock assessments
- Solicit proposals and award Species Recovery Grants to states and Tribes for conservation and recovery activities with a focus on Species in the Spotlight
- Respond to marine animal strandings and unusual mortality events
- Solicit, review, and Prescott grant proposals submitted by stranding networks for marine animal stranding activities
- Participate in international and regional agreements to further the U.S. policy on protected species conservation

**Deliverables:**

FY 2017–2021

- ESA proposed and final listing regulations, Section 4(d) rules, and critical habitat regulations
- Formal and informal consultation with other Federal agencies
- ESA Section 6 agreement with American Samoa
- Recovery plans for newly listed species with specific actions to prevent species extinction
- Timely issuance of MMPA and ESA permits, including scientific research permits and incidental harassment authorizations
- Improved or newly developed abundance and fishery mortality estimates for stocks in Alaska, the Pacific Islands, and the Gulf of Mexico to inform management decisions
- MMPA List of Fisheries classifying U.S. commercial fisheries into one of three Categories according to the level of incidental mortality or serious injury of marine mammals
- Marine Mammal Stock Assessment Reports

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Number of protected species designated as threatened, endangered or depleted with stable or increasing population levels (Indicator 3.4d)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	31/73	31/90*	26/90	26/90	26/90	26/90	26/90
<p><b>Description:</b> This measure tracks progress toward the recovery of endangered, threatened, or depleted protected species under NMFS’ jurisdiction. These species are listed as threatened or endangered under the Endangered Species Act (ESA) or as depleted under the Marine Mammal Protection Act (MMPA). Recovery of threatened, endangered, or depleted species can take decades. It may not be possible to recover or de-list a species in the near term, but progress can be made to stabilize or increase the species population. For some species, this means trying to stop steep population declines, while for others it means trying to increase their numbers. As of FY 2017, this measure tracks 90 species/stocks designated as threatened, endangered, or depleted. Denominators are shown for reference.</p> <p>* NOAA begins tracking newly listed species a full fiscal year after they were listed. In FY 2016 we will begin tracking 14 coral species and 3 scalloped hammerhead shark distinct population segment (DPS).</p>							

<b>Performance Measure:</b> Percent of protected species with adequate population assessments and forecasts (Indicator 3.4c)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	18.7% (77/412)	20.7% (89/429)	19.6% (84/429)	21.2% (91/429)	22.4% (96/429)	22.1% (95/429)	22.6% (97/429)
<b>Description:</b> This measure tracks the percentage of protected species stocks for which adequate assessments are available. Assessments are vital to determine the scientific basis for supporting and evaluating the impact of management actions. To be deemed adequate, assessments must be based on recent quantitative or qualitative analysis sufficient to determine current stock status based on a variety of data category levels such as life history, stock structure, abundance, threats, assessment quality, assessment frequency, and conservation status. Stock status projections are highly dependent on survey frequencies, assessment timeframes, and fiscal constraints. This measure covers the protected species stocks covered by the MMPA or listed under the ESA. The number of such stocks continues to increase as new species are listed and as new stocks of listed species and marine mammals are identified—the latter typically indicates increased knowledge about population stock structure. Denominators are shown for reference.							

<b>Performance Measure:</b> Number and percentage of recovery actions ongoing or completed (Indicator 3.4e)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	2157/ 4482 (48.1%)	2229/ 4542* (49.1%)	2278/ 9476** (24.0%)	2324/ 9476 (24.5%)	2368/ 9476 (25.0%)	2410/ 9476 (25.4%)	2452/ 9476 (25.9%)
<b>Description:</b> This measure tracks the progress of ongoing or completed recovery actions included in NMFS approved recovery plans for species listed as threatened or endangered under the ESA. The ESA requires NMFS to prepare recovery plans for each endangered or threatened species. The plans include a list of actions necessary to remove species from the ESA. These recovery actions may include items that can be completed in a year or others, including monitoring, that may take many years to complete or are ongoing. Recovery of threatened or endangered species is a gradual process that can take decades, and completed recovery actions can show incremental progress made in achieving recovery. Denominators are shown for reference.							
*The increase in the total number of actions in FY 2016 is due to the addition of one new recovery plan with new recovery actions. **The large increase in FY 2017 is due to the addition of multiple new Pacific salmon recovery plans with thousands of new recovery actions.							

<b>Performance Measure:</b> Number of Section 7 formal consultations and authorizations completed for proposed Federal activities (annual)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	123	200	200	200	200	200	200
<b>Description:</b> This measure assumes an average of 150 completed formal consultations based on prior year history. Completing timely Section 7 consultations, as required by the Endangered Species Act, facilitates species protection and economic activity.							



## **PROGRAM CHANGES FOR FY 2017:**

### **Marine Mammals, Sea Turtles and Other Species: Increase Consultation Capacity (Base Funding<sup>2</sup>: \$111,655,000 and 464 FTE; Program Change: +\$13,452,000 and +26 FTE):**

NOAA requests an increase of \$13,452,000 and 26 FTE for a total of \$125,107,000 and 490 FTE to increase consultation and permitting capacity mandated by sections 7 and 10 of the Endangered Species Act (ESA) and sections 104 and 101(a)(5) of the Marine Mammal Protection Act (MMPA). This funding will also support ESA recovery planning and implementation for the 20 coral species recently listed as threatened.

NOAA will target some of this increase to support consultations related to Deepwater Horizon and RESTORE Act projects. Restoration and associated consultation activities began in 2015, and could continue for 10–20 years, depending on the timing and administration of the trust fund. Activities also include work on the Long-term Water Operations for the State Water Project and Central Valley Water Project Biological Opinion Remand, development and review of the Bay-Delta Conservation Plan, and increased capacity to address in-season requests for flexible water operations related to the drought. This initiative supports the Cross-Agency Priority Goal for Infrastructure Permitting Modernization. With increased capacity, NOAA will reduce delays and improve permitting timeframes for projects that benefit the Nation's economy and create new jobs.

NOAA's broad initiative to expand consultation capacity also includes efforts to conserve essential fish habitat (EFH) under the Magnuson-Stevens Act (MSA). The balance (\$6,447,000 and 12 FTE) of the consultation initiative will fund increased EFH consultation capacity under the Habitat Conservation and Restoration PPA. Together this increased capacity will reduce delays and improve permitting and review timeframes for projects that benefit the Nation's economy and create new jobs. For example, these efforts will guide coastal development in a manner that protects listed species and vital fish habitat while enabling sustainable economic development, including critical transportation and infrastructure improvements.

#### **Proposed Actions:**

NOAA faces four emerging large-scale natural resource management and conservation issues that will challenge its ability to meet consultation and permitting requirements under the ESA and MMPA:

1. Additional consultation and permitting requirements related to the California drought and Pacific salmonid recovery;
2. Significantly increasing consultation and permitting needs in the Southeast and the Pacific Island Regions in response to new coral species listings;
3. Additional consultation and permitting requirements resulting from Gulf of Mexico restoration activities related to the Deepwater Horizon oil spill; and,
4. Compliance with Executive Order 13604 for Improving Performance of Federal Permitting and Review of Infrastructure Projects and the Fixing America's Surface Transportation Act (FAST Act).

NMFS will direct \$10.5 million of the proposed funding to increase ESA and MMPA consultation capacity to reduce the current backlog of consultations and enable us to

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<sup>2</sup> Base funding amount reflects the entire Marine Mammals, Sea Turtles and Other Species PPA because funding for consultation efforts reflects annual priorities and also exists in the Atlantic and Pacific Salmon PPAs. The total estimated base within this PPA for consultation efforts in FY 2017 is \$9.5 million.

address incoming consultations without delay. Activities include providing technical assistance, reviewing permits, conducting formal and informal consultations, and engaging in post-project implementation monitoring and adaptive management to ensure project improvements. NOAA will attain efficiencies by doing more programmatic consultations, which establish a consistent framework by which individual projects can be planned, authorized, and implemented across larger areas, often on regional or national scales.

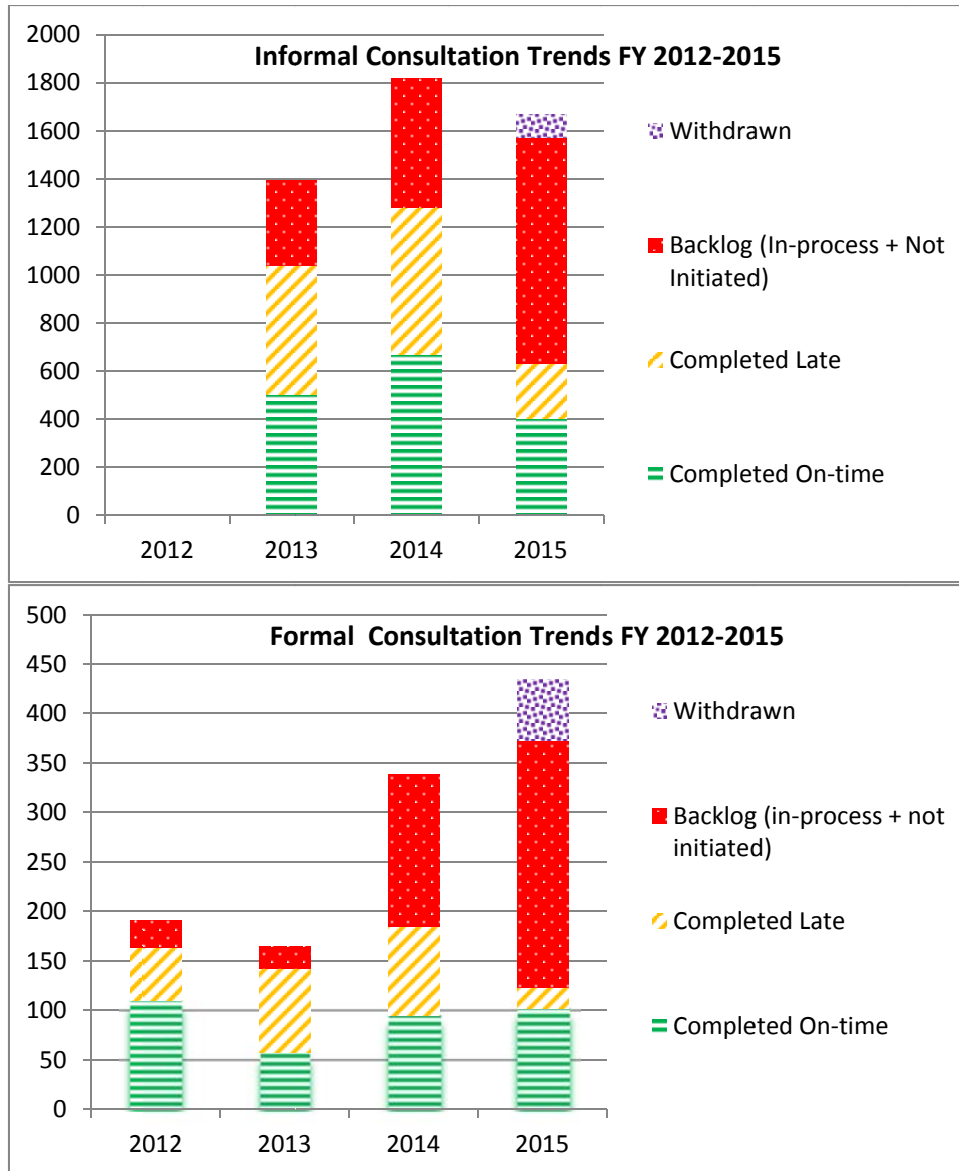
NMFS will direct the remaining \$3.0 million to support recovery planning and implementation and section 7 consultations for the 20 newly listed coral species. The listing rule identifies 19 threats to the survival of coral, including: rising ocean temperatures, ocean acidification, coral disease, fishing, land-based sources of pollution, and damage from marine/coastal construction and development activities. To better understand these threats and identify coral conservation actions, NMFS will increase coral research and develop recovery plans that identify actions to reduce or eliminate threats to coral recovery.

**Statement of Need and Economic Benefits:**

Permitting delays can have significant economic impact. For example, in January 2014, a chemical company seeking a permit from the Environmental Protection Agency (EPA) alerted NMFS that they were within weeks of losing \$587.0 million in private equity capital because the contract was tied to a fixed permitting schedule. In this case, NMFS was able to set aside other consultations and complete this one with EPA, allowing the project to move forward; however, this illustrates the economic risks of consultation delays.

Pursuant to the ESA, NOAA is required to complete the formal Section 7 consultation process within 135 days or, when extended, to a date set by mutual agreement of the action agency and NMFS. NMFS policy is to complete informal consultations, the process of assisting agencies in evaluation of potential project effects on species and habitat, within a non-statutory timeframe of 30 days, when possible. Informal consultations involve discussions between the action agency and NMFS to determine if there are ways to avoid adverse effects to the listed species or critical habitat. If adverse effects are unavoidable, the Federal agency initiates formal consultation. Consultation backlogs and delays in permitting exist due to the high volume of consultation requests that NMFS receives relative to staff available to meet demand.

The consequences of incomplete or delayed Section 7 consultations and permitting for research and enhancement include delayed economic activity, potential damage to NOAA trust resources as well as litigation risk, hampered decision-making, and political controversy.



(Note for the graphs above: NMFS did not start tracking informal consultations until FY 2013. Withdrawn consultations result when an action agency decides not to implement the proposed action due to lack of funding, changes in priority, or other reasons. NMFS improved data tracking in FY 2015. In previous years, withdrawn consultations were counted as open/late consultations).

**Resource Assessment:**

Over the past six years, NOAA has received an average of 1,500 requests for consultations per year (see graphs above). By the end of FY 2015, a combination of new ESA listings, unexpected requests related to disasters, and internal staffing shortages resulted in a backlog of 1,193 consultations (250 formal, 943 informal), compared to 688 in FY 2014. NMFS Section 7 biologists conduct an average of 12 consultations each year although, for large consultations, multiple biologists may work on one consultation. For example, three to five biologists work on consultations with the EPA for re-registering each of 37 pesticide active ingredients. As new species are listed and permits are required for research and

enhancement, NOAA’s ability to review applications, provide technical assistance, and issue permits in a timely manner has diminished due to no increase in staff capacity. NOAA’s relatively low on-time completion rate (50 percent target for FY 2017) has impacted other agencies’ abilities to complete projects (e.g., road and bridge construction, water projects).

Also, in September 2016, NMFS listed 20 species of coral as threatened. This listing has resulted in a dramatic increase in workload that exceeds current funding and staffing levels.

**Schedule and Milestones:**

FY 2017–2021:

- Provide technical assistance, consultation, and authorization services for all Federal agencies’ proposed actions
- Develop programmatic consultation mechanisms
- Develop a long-term, robust adaptive management program for the CA Bay-Delta region
- Conduct research to understand threats and recovery actions for the newly listed coral species
- Develop recovery plans for newly listed coral species
- Update the Recovery Online Activity Reporting System with recovery actions initiated

**Deliverables:**

FY 2017–2021:

- 100-115 additional formal ESA section 7 consultations conducted per year, in addition to informal consultations
- Central Valley Water Project Biological Opinion
- 5 additional ESA section 10 take permits issued per year
- Final protective regulations (Section 4(d) rules), recovery plans and critical habitat designations for the newly listed coral species
- Developed and permitted the Bay-Delta Conservation Plan

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Number of Section 7 formal consultations and authorizations completed for proposed Federal activities (annual)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	300	305	315	315	315
<b>Without Increase</b>	123	200	200	200	200	200	200
<b>Description:</b> This measure assumes an average of 150 formal consultations received based on prior year history. Completing timely Section 7 consultations, as required by the Endangered Species Act, facilitates species protection and economic activity. Increased consultations and related authorizations represent incremental improvement in performance by increased capacity and efficiencies in out years.							

<b>Performance Measure:</b> Percent of Section 7 consultations completed on time (annual)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	65%	67%	70%	70%	70%
<b>Without Increase</b>	24%	50%	50%	50%	50%	50%	50%
<b>Description:</b> This measure provides the percentage of formal (within 135 days) and informal (within 30 days) consultations completed on-time within a fiscal year. This measure assumes a base of 1,100 formal and informal consultations based on prior year history.							

**PROGRAM CHANGE PERSONNEL DETAIL**

**Budget Program:** National Marine Fisheries Service  
**Sub-program:** Protected Resources Science and Management  
**Program Change:** Increase Consultation Capacity

<b>Title:</b>	<b>Location</b>	<b>Grade</b>	<b>Number of Positions</b>	<b>Annual Salary</b>	<b>Total Salaries</b>
Fishery Biologist	St. Petersburg, FL	ZP-3	9	\$58,562	\$527,058
Fishery Biologist	Honolulu, HI	ZP-3	9	\$59,767	\$537,903
Fishery Biologist	Sacramento, CA	ZP-3	5	\$62,686	\$313,430
Fishery Biologist	Silver Spring, MD	ZP-3	3	\$63,722	\$191,166
Fishery Biologist	Silver Spring, MD	ZP-4	2	\$90,823	\$181,646
Fishery Biologist	Gloucester, MA	ZP-3	3	\$64,020	\$192,060
Fishery Biologist	Juneau, AK	ZP-3	2	\$63,963	\$127,926
Fishery Biologist	Long Beach, CA	ZP-3	2	\$65,231	\$130,462
Subtotal			<u>35</u>		<u>\$2,201,651</u>
2016 Pay Adjustment	1.3%				\$28,621
Total					\$2,230,272
Less Lapse	25%		<u>(9)</u>		<u>(\$557,568)</u>
Total Full-time permanent:			<u>26</u>		<u>\$1,672,704</u>
2017 Pay Adjustment	1.6%				\$26,763
<b>TOTAL</b>			26		\$1,699,467
<b>Personnel Data</b>			<b>Number</b>		
Full-time permanent			26		
Other than full-time permanent			0		
<b>Total</b>			<u>26</u>		
Authorized Positions:					
Full-time permanent			35		
Other than full-time permanent			0		
<b>Total</b>			<u>35</u>		

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** National Marine Fisheries Service  
**Sub-Program:** Protected Resources Science and Management  
**Program Change:** Increase Consultation Capacity

<b>Object Class</b>	<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11 Personnel compensation		
11.1 Full-time permanent	\$1,699	\$51,509
11.3 Other than full-time permanent	0	1,137
11.5 Other personnel compensation	0	148
11.8 Special personnel services payments	0	217
11.9 Total personnel compensation	1,699	53,011
12 Civilian personnel benefits	511	16,549
13 Benefits for former personnel	0	12
21 Travel and transportation of persons	595	2,992
22 Transportation of things	0	90
23.1 Rental payments to GSA	0	2,273
23.2 Rental Payments to others	0	476
23.3 Communications, utilities and miscellaneous charges	0	1,660
24 Printing and reproduction	26	658
25.1 Advisory and assistance services	9,097	19,579
25.2 Other services	0	152
25.3 Purchases of goods & services from gov't accounts	0	10,622
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	854	1,709
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	125	2,469
31 Equipment	185	671
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	360	12,184
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	13,452	125,107

**Species Recovery Grants: Species Recovery Grants (Base Funding: \$6,008,000 and 3 FTE; Program Change: + \$16,012,000 and 0 FTE):** NOAA requests an increase of \$16,012,000 and 0 FTE for a total of \$22,020,000 and 3 FTE for the conservation and recovery of marine and anadromous species through the Species Recovery Grant Program.

**Proposed Actions:**

Species Recovery Grants support recovery actions for species listed under the Endangered Species Act (ESA) and are awarded to states and Tribes under the authority of ESA Section 6 and the Fish and Wildlife Coordination Act. Recovery actions are those actions needed to recover species so that the protections of the ESA are no longer necessary. Recovery actions include addressing significant sources of mortality and injury, assessing species status and trends, developing conservation plans to minimize and mitigate bycatch, conserving habitat, and educating and engaging the public. The Species Recovery Grants Program is NMFS' primary mechanism for funding and implementing recovery actions for listed species.

With the request, NMFS proposes to dramatically expand its work with states and Tribes and fund a greater number and increased scale of recovery actions for more listed species. This in turn will help our state and tribal partners meet the escalating management needs for the growing number of listed species. Awarding larger-scale, multi-state, ecosystem-focused projects is crucial to advancing species recovery as species' ranges and threats occur on large spatial-scales that rarely align with jurisdictional boundaries.

With this increase, NMFS will also prioritize funding for grants that address non-Pacific salmonid species in the "Species in the Spotlight: Survive to Thrive" initiative<sup>3</sup>. This new initiative focuses internal and external efforts and resources on preventing the extinction of the most vulnerable species. (Note: Pacific salmonid Species in the Spotlight are addressed through the Pacific Coastal Salmon Recovery Grants.)

Two competitive grant programs are administered under the Species Recovery Grant Program—one for states and one for Tribes, both of which have management authorities and responsibilities for listed species and are uniquely qualified to partner with NMFS on implementation of recovery actions. These partnerships leverage existing state and tribal resources and expertise. Section 6 of the ESA includes a cost-sharing provision that requires states to provide 25 percent of total project costs, or 10 percent of total project costs when two or more states work together.

Recovery actions for listed species are identified in NMFS recovery plans, which are developed by expert teams and are subjected to public and peer reviews before being finalized. Proposals selected for Species Recovery Grant funding are those that address high priority recovery actions. Grants may also support needed monitoring of candidate and recently delisted species. Species Recovery Grants are administered in close coordination with the Community Based Restoration Program (CBRP), the Pacific Coastal Salmon Recovery Fund (PCSRF), and Marine Mammal Take Reductions Teams to realize efficiencies, identify strategic opportunities, and achieve significant conservation benefits on a national scale.

**Statement of Need and Economic Benefits:**

As of January 1, 2016, NMFS had jurisdiction over 129 threatened or endangered species. In addition, 30 species have been proposed for listing, 14 species are candidates for listing, and an additional five species are the subject of listing petitions currently under review by NMFS.

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<sup>3</sup> [http://www.nmfs.noaa.gov/stories/2015/05/05\\_14\\_15species\\_in\\_the\\_spotlight.html](http://www.nmfs.noaa.gov/stories/2015/05/05_14_15species_in_the_spotlight.html)



Thus, more species will likely be ESA-listed in 2016 and 2017, which will increase the workload associated with fulfilling statutory requirements (e.g., Section 7 consultations, Section 10 permitting) and result in a decrease in the available funding per species for recovery actions. State agencies that share management responsibilities for these species will require additional support to adequately manage the growing number of ESA-listed species in state waters.

Twenty-five states and U.S. territories, from Guam to Alaska to Puerto Rico, and all Federally recognized Tribes are eligible for this funding. Funding may be applied to any species under NMFS' jurisdiction—from blue whales to black abalone (with the exception of Pacific salmonids, which are supported through PCSRF). Over \$34.0 million in Federal grant funding has been provided to states, Tribes, and approximately 53 of their partner organizations to support conservation and recovery of 26 threatened or endangered species since FY 2003.

Examples of funded work to date include Hawaiian monk seal disentanglement and rescue; captive breeding efforts to prevent extinction of white abalone; an Atlantic coast sturgeon tagging network and database; and repair of water control structures to allow Atlantic salmon access to historical spawning grounds. These investments have contributed to species recovery and created green jobs. There is significant public interest in these species, which often have recreational and commercial value for coastal states, as well as cultural and subsistence value for Tribes. Recovering and preserving these species for future generations will have even larger economic, educational, and societal benefits.

**Resource Assessment:**

NOAA has final recovery plans for 27 non-salmonid ESA-listed species. Of the nearly 2,000 recovery actions in these plans, 73 percent are ongoing, but only four percent are complete. As the number of species listed increases, the number of recovery plans and recovery actions will continue to grow. This funding increase will allow NMFS to collaborate with partners and conduct approximately 80 more recovery activities in FY 2017.

**Schedules and Milestones:**

FY 2017 – 2021:

- Solicit proposals and award Species Recovery Grants to states and Tribes for conservation and recovery activities with a focus on Species in the Spotlight
- Fund 80 additional recovery actions per year
- Update the U.S. Fish and Wildlife Service Recovery Online Activity Reporting System and the Species Recovery Grants Tracking Database

**Deliverables:**

FY 2017 – 2021:

- Recovery actions identified in recovery plans implemented to prevent species extinction and further recovery
- Section 6 agreement with American Samoa completed

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Number of recovery activities being addressed through Species Recovery Grants	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	110	110	110	110	110
<b>Without Increase</b>	29	30	30	30	30	30	30

**Description:** Funding may support recovery activities for any of the listed species under NMFS jurisdiction, with the exclusion of Pacific salmonids. Recovery activities are the incremental activities that contribute to species recovery (e.g., captive breeding of white abalone, reducing vessel interactions with killer whales). An assumption of \$200,000 per priority recovery action is applied here.

*Note: NMFS is developing an online database for use by agency personnel to track successfully completed priority recovery actions. NMFS will use this tool to more accurately track and evaluate species progress to recovery.*

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** National Marine Fisheries Service  
**Sub-program:** Protected Resources Science and Management  
**Program Change:** Species Recovery Grants

Object Class	FY 2017 Increase	FY 2017 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$202
11.3 Other than full-time permanent	0	8
11.5 Other personnel compensation	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	210
12 Civilian personnel benefits	0	54
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	2
22 Transportation of things	0	0
23.1 Rental payments to GSA	0	6
23.2 Rental Payments to others	0	0
23.3 Communications, utilities and miscellaneous charges (boats)	0	1
24 Printing and reproduction		
25.1 Advisory and assistance services	0	6
25.2 Other services	0	22
25.3 Purchases of goods & services from Gov't accounts	0	7
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	5
31 Equipment	0	0
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	16,012	21,706
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	16,012	22,020

**Pacific Salmon: Pacific Salmon (Base Funding: \$61,082,000 and 322 FTE: Program Change: +\$2,338,000 and 0 FTE):** NOAA requests an increase of \$2,338,000 and 0 FTE for a total of \$63,420,000 and 322 FTE for Endangered Species Act (ESA) Pacific salmon recovery.

**Proposed Actions:**

NOAA proposes to increase funding for ESA salmon recovery. ESA requires NOAA to develop and implement recovery plans for listed salmon and steelhead species. Recovery plans identify actions needed to restore threatened and endangered species to the point that they are again self-sustaining and no longer need the protections of the ESA. The funding increase will enable NMFS to strengthen its cooperative work to implement actions identified in recovery plans. Actions in recovery plans cover a range of activities such as understanding status and trends of populations and their habitats, hatchery reforms, hatchery and genetic management plans (HGMPs), changes in harvest management, monitoring, prioritized habitat restoration, and addressing non-native and predatory species interactions and disease.

Salmon recovery is a shared responsibility that requires action at all levels of government and by all stakeholders. Partnerships among Federal, state, local, and tribal entities, together with non-governmental and private organizations, are key to restoring healthy salmon runs and securing the economic and cultural benefits they provide. Specifically under this proposal, NOAA will:

1. Expand Pacific salmon monitoring in Puget Sound, along California's coast, and in the Central Valley;
2. Work with hatchery operators/managers to improve hatchery practices to reduce impacts on ESA listed fish, and increase our consultation capacity to review salmonid HPMGs across the West Coast Region (i.e., CA, OR, WA, and ID) to improve our on-time consultation completion rate; and
3. Continue to work with stakeholders and partners in the Columbia River Basin to implement actions to recover endangered and threatened salmon and steelhead.

**Statement of Need and Economic Benefits:**

This proposed funding is necessary for conservation and recovery of Pacific salmon and steelhead on the West Coast, particularly in the Columbia River Basin, the Klamath River Basin, and numerous other small streams and river reaches. Currently, the population trend of most ESA-listed salmon and steelhead in California is unknown. Pacific salmon monitoring and assessments provide the fundamental information for determining the status of a population and for managing the species. Lack of adequate data can lead to less robust analyses when NOAA assesses the impacts of various activities on protected species and their habitats. By increasing data about species' status and trends, there may be potential for increased opportunity (e.g., harvest) and thereby increased economic benefits. Similarly, improved science allows for development of more precise, targeted, and prioritized recovery strategies.

Over the last several years, states, Tribes, and Federal agencies (i.e., hatchery owner/operators) have been sued over ESA and NEPA compliance for their hatchery programs. In addition, the stream of HGMPs for review and consultation has increased. Continued hatchery operation is essential to sustaining current abundance of Pacific salmonid stocks through supplementing natural production for conservation purposes and/or harvest opportunity. Hatcheries that are out of compliance with the ESA and NEPA are at risk of litigation and reduced production. Increasing NMFS' ability to process the reviews and recommend compliance measures will reduce the risk to hatchery operations, the species, and the economy.

**Resource Assessment:**

NMFS conducts stock assessments, measures vital survival rates, conducts interagency ESA Section 7 consultations, issues ESA Section 10 incidental take permits, identifies and implements recovery actions, and leads the U.S. international management efforts for ESA salmon. NOAA currently completes ESA Section 7 consultations on approximately 50 HGMPs per year. At current funding levels, there is an anticipated backlog of 276 HGMPs needing consultation by the end of FY 2016.

**Schedule and Milestones:**

FY 2017 – 2021:

- Conduct ESA Section 7 consultations on proposed Federal actions in the estuarine and marine environment and for dams and hatcheries
- Monitor salmon and steelhead populations

**Deliverables:**

FY 2017 – 2021:

- Completion of informal and formal Section 7 consultations on actions in the estuarine and marine environment and dams and hatcheries
- Quantification of individual and cumulative upstream and downstream fish passage survival at hydro dams
- Scientific review of monitoring facilities study plan and results to determine compliance with quantitative fish passage metrics
- Publish Annual Status of Stocks Report

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Number and percentage of recovery actions ongoing or completed (Indicator 3.4e)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	2283/ 9476* (24.1%)	2334/ 9476 (24.6%)	2383/ 9476 (25.6%)	2477/ 9476 (26.1%)	2523/ 9476 (26.3%)
<b>Without Increase</b>	2157/ 4482 (48.13%)	2229/ 4542* (49.1%)	2278/ 9476** (24.0%)	2324/ 9476 (24.5%)	2368/ 9476 (25.0%)	2410/ 9476 (25.4%)	2452/ 9476 (25.9%)

**Description:** This measure tracks the progress of ongoing or completed recovery actions included in NMFS approved recovery plans for species listed as threatened or endangered under the ESA. The ESA requires NMFS to prepare recovery plans for each endangered or threatened species. The plans include a list of actions necessary to remove species from the ESA. These recovery actions may include items that can be completed in a year or other actions, including monitoring, that may take many years to complete or be ongoing. Recovery of threatened or endangered species is a gradual process that can take decades, and completed recovery actions can show incremental progress made in achieving recovery. Denominators are shown for reference.

\*The increase in the total number of actions in FY 2016 is due to the addition of one new recovery plan with new recovery actions.

\*\*The large increase in FY 2017 is due to the addition of multiple new Pacific salmon recovery plans with thousands of new recovery actions.

<b>Performance Measure:</b> Number of Section 7 formal consultations and authorizations completed for proposed Federal activities (annual)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	207	207	208	210	210
<b>Without Increase</b>	123	200	200	200	200	200	200

**Description:** This measure assumes an average of 150 formal consultations received based on prior year history. Completing timely Section 7 consultations, as required by the Endangered Species Act, facilitates species protection and economic activity. Increased consultations and related authorizations represent incremental improvement in performance by increased capacity and efficiencies in out years.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** National Marine Fisheries Service  
**Sub-program:** Protected Resources Science and Management  
**Program Change:** Pacific Salmon

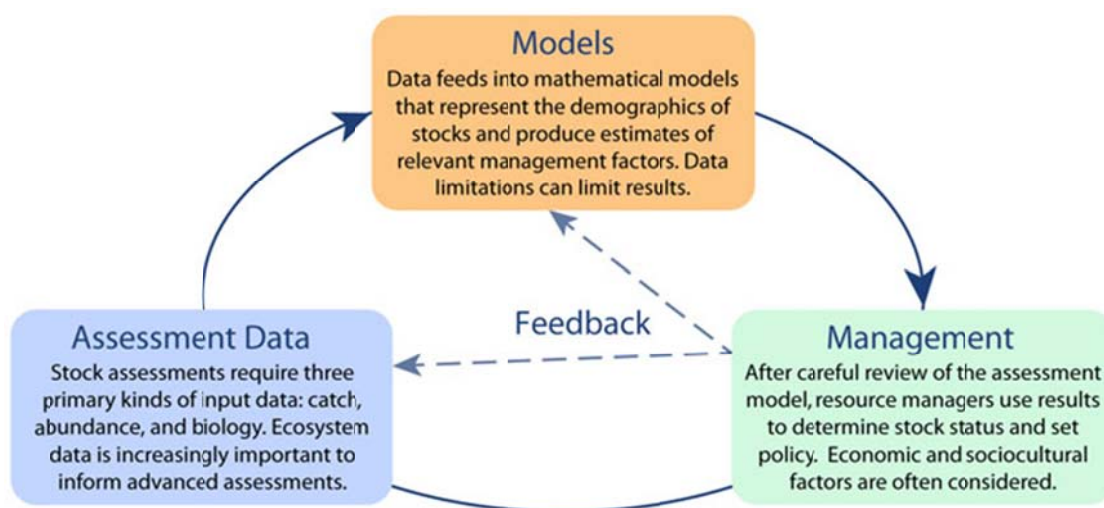
Object Class	FY 2017 Increase	FY 2017 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$38,178
11.3 Other than full-time permanent	0	751
11.5 Other personnel compensation	0	235
11.7 Special personnel services payments	0	0
11.9 Total personnel compensation	0	39,164
12 Civilian personnel benefits	0	11,794
13 Benefits for former personnel	0	14
21 Travel and transportation of persons	0	390
22 Transportation of things	0	149
23.1 Rental payments to GSA	0	2,542
23.2 Rental Payments to others	0	5
23.3 Communications, utilities and miscellaneous charges	0	597
24 Printing and reproduction	0	391
25.1 Advisory and assistance services	1,037	5,288
25.2 Other services	400	465
25.3 Purchases of goods & services from Gov't accounts	0	162
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	19
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	50	720
31 Equipment	100	308
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	751	1,412
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	2,338	63,420

## APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES SUB-PROGRAM: FISHERIES SCIENCE AND MANAGEMENT

The Fisheries Science and Management sub-program encompasses scientific and management activities to ensure sustainability and apply an ecosystem-based management approach to the stewardship of the Nation's marine fishery resources.

In partnership with the eight Regional Fishery Management Councils (FMC) and state and Federal partners, NMFS manages marine fisheries, including aquaculture, using the best available science. NMFS actions result in sustainable fisheries harvest and production, rebuilding of depleted fish stocks, conservation and restoration of essential fish habitats, and other support for fishing communities. NMFS' science, which is rigorously peer-reviewed, ensures management decisions are based on the highest-quality scientific information. NMFS conducts science on species' responses to environmental changes; impacts of fishing and other human activities on fisheries and their habitat; and social, cultural, and economic behaviors that influence interactions between humans and marine fisheries.

This sub-program supports the regulatory process, which involves extensive analysis of alternatives to meet a number of statutory requirements and agency priorities, and involves Regional Councils, Interstate Marine Fisheries Commissions, and states.



Science informing management: High quality science information assists managers in making important decisions to ensure sustainable fisheries, healthy ecosystems, and productive coastal communities.

### Fisheries and Ecosystem Science Programs and Services

The Fisheries and Ecosystem Science Programs and Services budget line supports NMFS science to prevent and eliminate overfishing, rebuild overfished stocks, support sustainable aquaculture, conserve and restore habitats, and support fishing communities.



### *Fisheries Science Base Activities*

These funds support science used for the analysis and decision-making that support ecosystem approaches to fisheries management, Fishery Management Plans (FMP) and regulatory implementation, and enforcement to ensure compliance with regulations. Major activities include the following:

- *Regional Science and Operations:* Supports core survey and science work in the regional Science Centers (Centers) such as fishery catch monitoring, survey and stock assessments, charters for survey vessels, fuel, supplies, etc. Also supports research projects at the Centers, including collaborative research projects with other institutions on topics such as pelagic fisheries and groundfish.
- *Recreational Fisheries Information:* Supports the Marine Recreational Information Program's (MRIP) work to improve and expand NMFS' data collection efforts for monitoring recreational fisheries impacts. MRIP has improved sampling design and accuracy of shoreside angler surveys. NMFS recently funded a National Angler Attitudes and Perspective Survey that provided the first comprehensive nation-wide data on marine angler attitudes and preferences. This data is fundamental to successfully targeting improvements to recreational fishing.
- *Marine National Monuments:* Supports science and management activities, including the development of collaborative 15 year management plans for the Marianas Trench, Rose Atoll, and the Pacific Remote Islands Marine National Monuments. The Pacific Monuments encompass nearly 481,000 square miles—which includes the expansion of the Pacific Remote Island Monuments in 2014—making it the world's largest marine reserve.
- *West Coast Groundfish Management and Research:* Provides the key stock assessment science support for management of more than 80 fish stocks along the coasts of Washington, Oregon, and California.
- *Atlantic Bluefin Tuna Observer Coverage and Monitoring:* Supports observer coverage in the pelagic longline fishery in the Gulf of Mexico where Atlantic bluefin tuna are incidentally caught; the program also facilitates bluefin tuna stock assessments.
- *Electronic Monitoring and Electronic Reporting:* Supports the development and implementation of electronic monitoring (EM) and reporting (ER) working with industry to integrate technology into data collections and observations to improve the timeliness, quality, integration, cost effectiveness, and accessibility of fishery-dependent data. In 2016, these funds will facilitate implementation of additional EM programs in two FMPs in the Northeast and West Coast. Pre-implementation of EM will continue in Alaska in 2017, in preparation for implementation in 2018.
- *Aquaculture:* Conducts science for sustainable domestic aquaculture, supporting contributions to the U.S. seafood supply, job creation in coastal communities, enhanced commercial and recreational fisheries, and habitat restoration.

### *Economics and Social Science Research*

The program supports NMFS economists and social scientists conducting legislatively mandated (e.g., NEPA, MSA) economic and social analysis for almost 300 rulemakings each year. Underpinning these assessments is a broad range of socio-economic data collection, modeling, and, increasingly, a number of commercial and recreational fisheries decision support tools. This work addresses traditional fishery management issues (e.g., effects of rebuilding programs, catch share programs, aquaculture, and fishery allocation decisions on fishermen and communities) and emerging coastal and marine resource management issues such as ecosystem services trade-offs and valuation, and community resiliency.

### *Fisheries Oceanography*

Ecosystem-based approaches to management rely upon research that integrates biological, socio-economic, environmental, and oceanographic data into predictive models that improve NOAA's ability to manage resources over the long-term. Fisheries Oceanography funds are distributed between two efforts: Fisheries and the Environment (FATE) and Integrated Ecosystem Assessment (IEA) programs. FATE projects analyze the response of living marine resources to environmental change. The IEA program conducts research and develops products to enhance scientific advice for better managing the Nation's resources and achieving ecological and societal objectives. IEAs assess ecosystem status and trends relative to ecosystem management goals, analyze risks and uncertainty, and evaluate trade-offs between management options.

### *Antarctic Research*

The U.S. Antarctic Marine Living Resources Convention Act requires that the Department of Commerce conduct directed scientific research to "achieve the United States goal of effective implementation of the objectives of the Convention [on the Conservation of Antarctic Marine Living Resources]." NOAA's Antarctic Ecosystem Research Division implements the U.S. Antarctic Marine Living Resources program. This program is NOAA's only dedicated, long-term ecological presence in the Antarctic, with observations dating back to 1986.

### *Climate Regimes & Ecosystem Productivity*

The Climate Regimes & Ecosystem Productivity (CREP) program provides decision-makers with information on how climate variability and change are impacting U.S. marine ecosystems and the communities and economies that depend on them. CREP is implemented in the North Pacific region through the North Pacific Climate Regimes and Ecosystem Productivity (NPCREP) project and the newly implemented distributed biological observatory (DBO). NPCREP provides information, assessments, and projections of climate-related impacts on living marine resources of the Bering Sea and Gulf of Alaska. This area includes some of the Nation's richest commercial fishing grounds—5.7 billion pounds of seafood were landed in Alaska, totaling 59 percent of U.S. landings, with a value of \$1.7 billion in 2014<sup>4</sup>—as well as protected species and other resources that native communities depend on. The DBO is an array of sensors designed to detect changes in nutrients, productivity, and biological abundances and diversity along a latitudinal gradient extending from the northern Bering Sea to the Chukchi and Beaufort Seas.

### *Information Analysis and Dissemination*

Requirements and directives for data collection, management, and dissemination are included in the MSA, MMPA, ESA, Aquaculture Act of 1980, Data Quality Act, and other policies and directives. The information analysis and dissemination program supports the NMFS infrastructure and staff that process, analyze, and produce data and disseminate it to resource managers and other users.

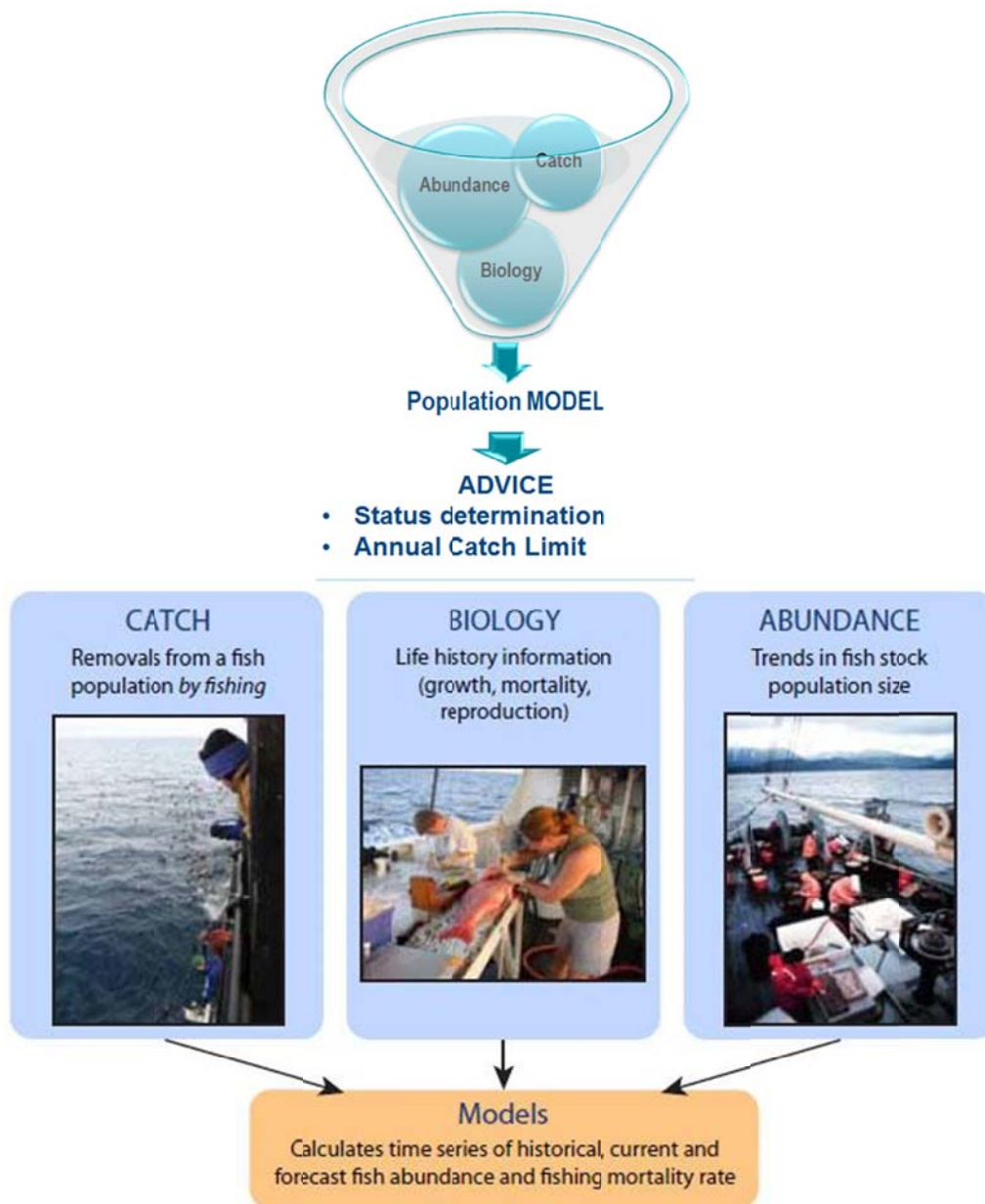
## **Fisheries Data Collections, Surveys, and Assessments**

One of NMFS' core functions is to provide accurate and timely assessments of fish and shellfish stocks that support commercial and recreational fisheries. Stock assessment models estimate a stock's status over time and forecast future dynamics to advise fishery managers in their development of sustainable harvest levels. Assessment models are most reliable when

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<sup>4</sup> National Marine Fisheries Service (2015) Fisheries of the United States, 2014. U.S. Department of Commerce, NOAA Current Fishery Statistics No.2014. Available at: <https://www.st.nmfs.noaa.gov/Assets/commercial/fus/fus14/documents/FUS%202014%20FINAL.pdf>

they incorporate high quality data on fishery removals, stock abundance and biology, and ecosystem and environmental variability (see figure below). Funds support data collection, data management, and fisheries stock assessment production.



*Expand Annual Stock Assessments (EASA)*

Stock assessments provide the technical basis for fishery management decisions, such as setting annual catch limits (ACLs) to achieve optimum yield from the fishery while avoiding overfishing and ecosystem harm. Assessment activities include: catch monitoring and surveys; data analysis and stock assessment modeling; advanced sampling technologies; habitat, climate and other ecosystem indicators; and stock assessment model improvements. In addition, NMFS is addressing critical gaps in stock assessments as identified in program reviews and the implementation of the new stock assessment improvement plan and

prioritization process. This process defines target frequency and assessment levels for each stock and facilitates the implementation of a next generation stock assessment framework. This framework includes assessments linked to climate, ecosystem, and habitat dynamics where appropriate, and at least baseline monitoring for all Federally-managed fish stocks.

#### *Fisheries Statistics*

Accurate data and reliable statistics on fishing effort and catch are essential for assessing fish stocks, as well as for monitoring performance relative to wild fishery management targets and aquaculture objectives. Funds are used to manage and conduct data collection, data processing, statistical analysis, information management, and statistical reporting activities for commercial and recreational fisheries.

#### *Fish Information Networks*

The Fish Information Networks program supports several state-Federal cooperative programs that coordinate data collection, data management, and information management activities, which are essential for accurate monitoring of commercial and recreational fishing impacts. These programs collect data and manage information on fishing participation, fishing effort, and catch. They also help collect fishery-dependent biological data needed for stock assessments. The programs included are: Atlantic States Marine Fisheries Commission, Gulf of Mexico Fisheries Information Network, Alaska Fisheries Information Network, Pacific Fisheries Information Network, Recreational Fisheries Information Network, National Fisheries Information System, and the Marine Fisheries Initiative.

#### *Survey and Monitoring Projects*

Projects include support for bluefin tuna tagging research, red snapper monitoring and research, West Coast groundfish surveys, Alaska extended jurisdiction programs, Maine and New Hampshire inshore trawl surveys, Bering Sea Pollock research, and Gulf of Maine groundfish assessment, to name a few. These targeted surveys and biological investigations improve the information available to conduct accurate stock assessments and directly contribute to the *Percentage of FSSI Stocks with Adequate Population Assessments and Forecasts performance indicator 3.4b*.

#### *American Fisheries Act*

NMFS collects data to support the following management measures for the American Fisheries Act (AFA): 1) regulations that limit access and allocate Bering Sea and Aleutian Islands (BSAI) pollock to the fishing and processing sectors of the BSAI pollock fishery, 2) regulations governing the formation and operation of fishery cooperatives in the BSAI pollock fishery, 3) regulations to protect other fisheries from spillover effects from the AFA, and 4) regulations governing catch measurement and monitoring in the BSAI pollock fishery.

#### *Cooperative Research*

Cooperative research enables commercial and recreational fishermen to become involved in collecting fundamental fisheries information that supports management options. Through cooperative research, industry and other stakeholders can partner with NMFS and university scientists in all phases of the research program—planning the survey and statistical design, conducting research, analyzing data, and communicating results.

#### *Marine Resources Monitoring, Assessment, and Prediction Program (MARMAP)*

MARMAP is a cooperative fisheries project of NMFS and the South Carolina Marine Resources Research Institute (MRRI). For more than 40 years, the MRRI has conducted fishery-independent surveys and research on groundfish, reef fish, and coastal pelagic fishes

between Cape Lookout, North Carolina and Cape Canaveral, Florida.

#### *Southeast Area Monitoring and Assessment Program (SEAMAP)*

Funding for SEAMAP supports the collection of fishery-independent data through state, Federal, and university partnerships. Partnership arrangements are set up through cooperative agreements in three areas: South Atlantic (North Carolina to Florida), Gulf of Mexico (Florida to Texas), and Caribbean (U.S. Virgin Islands and Puerto Rico). SEAMAP coordinates state and Federal surveys for the collection, management, and dissemination of fishery-independent data on marine resources.

#### **Observers and Training**

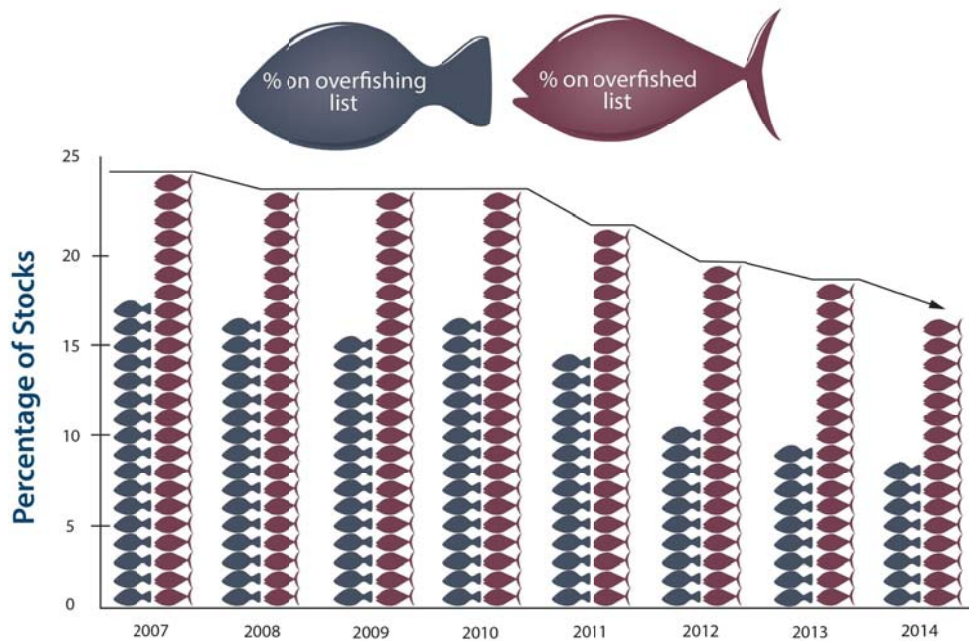
This program provides information and analyses on the biological, ecological, economic, and social aspects of the Nation's fisheries resources. The authority to place observers on commercial fishing and processing vessels is provided by the MSA, MMPA, and ESA. Fisheries observer programs are proven, unbiased, and valuable sources of information on the Nation's fisheries, and are a reliable and cost-effective means to collect fishery-dependent data. The scientific data collected by observer programs provide critical inputs for population assessments of threatened and endangered species such as sea turtles, seabirds, and marine mammals, and for effective management of the Nation's fish stocks.

Observers monitor fishing activities for 53 fisheries, including 10 catch share fisheries, across all five NMFS regions, and collect data for a range of conservation and management issues in various fisheries. This includes information on fishing practices, vessel and gear characteristics, fishing locations and times, environmental conditions within the fishing grounds, catch and bycatch, and socio-economic data.

#### **Fisheries Management Programs and Services**

Under the MSA and other fisheries legislation, this budget line supports: efficiently preventing and eliminating overfishing, rebuilding overfished stocks, supporting sustainable aquaculture, conserving and restoring habitats, and other research to support fishing communities. This work has enabled 39 fish stocks to be rebuilt and an ever-decreasing number of stocks experiencing overfishing, or determined to be overfished (see figure below).

## Stock Trends 2007 - 2014



Change in percentage of stocks subject to overfishing and overfished from 2007 through 2014 as shown in the Annual Report to Congress: Status of Stocks 2014.

### *Fisheries Management Base*

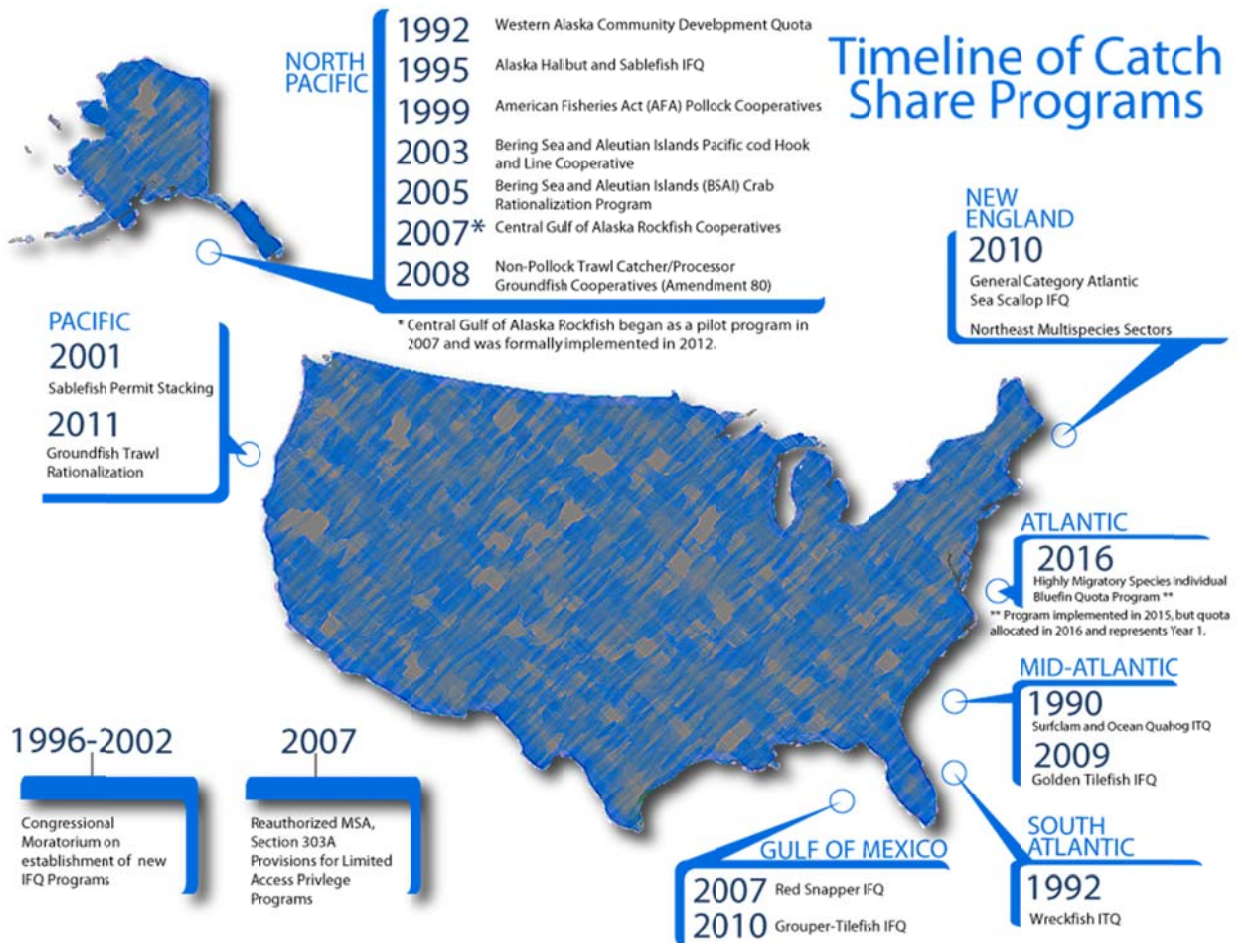
These funds support NMFS staff efforts to deliver the following services, including analysis and decision-making to support fisheries management and regulatory implementation:

- *Annual Catch Limits (ACLs) and Accountability Measures (AMs)*: ACLs and AMs prevent overfishing. NMFS monitors catch levels for domestic fisheries and makes adjustments to management when those levels are exceeded. NMFS reports on the percent of fish stocks that have exceeded their ACLs, which informs improvements to ACL management systems.
- *International Requirements of the MSA*: The international requirements of the MSA include strengthening the effectiveness of international fishery management organizations in conserving and managing fish stocks under their respective jurisdictions.
- *Illegal, Unreported, and Unregulated (IUU) Fishing*: NMFS publishes a biennial report identifying nations whose vessels are engaging in IUU fishing and bycatch of protected living marine resources and of certain sharks on the high seas. The identification of these nations allows the U.S. to take corrective actions. [Note: Enforcement actions required to prosecute and deter IUU fisheries actions are covered in the NMFS Enforcement Sub-program.]
- *National Standard Guidance*: NMFS develops and promulgates guidelines to assist in the implementation of MSA National Standards, principles that must be followed in any FMP to ensure sustainable and responsible fishery management.
- *Regional Fishery Management Councils Support*: NMFS assists in the development, review, and implementation of Council-proposed actions. NMFS staff assists the Councils with Secretarial approval and implementation of FMPs and amendments, and preparing analytical documents in support of rulemaking.

- *Electronic Monitoring and Reporting:* NMFS coordinates with partners to develop, analyze, and incorporate electronic technologies into fishery management.

### National Catch Share Program

Funding supports development of catch share programs, and implementation and operation of existing catch share programs. “Catch share” is a general term for strategies that allocate a specific portion of the total allowable fishery catch to individuals, cooperatives, communities, or other entities. The term includes specific programs defined in law, such as limited access privilege (LAP) and individual fishing quota (IFQ) programs. These programs allow fishermen to maximize their flexibility to time delivery of catch to the market. Catch share programs have been used in the U.S. since 1990 and now include 16 fisheries.



NMFS manages catch shares in every region except the Pacific Islands

The MSA allows some or all of the incremental operational costs for the catch share programs that meet the definition of a LAP program to be recovered once the catch share program is operational, but the total amount of cost recovery is capped at a maximum of three percent of the ex-vessel value of the fishery.

### *Reducing Bycatch*

NMFS supports research on gear technologies that reduce bycatch and bycatch mortality. Reducing bycatch can save fishing jobs by preventing fishery closures due to interactions with endangered species or attainment of strict bycatch quotas. This funding supports the Bycatch Reduction Engineering Program external competitive grants program, which supports innovative gear designs and fishing techniques to minimize bycatch.

### *Product Quality and Safety*

NMFS helps ensure that the Nation's seafood industry is economically sustainable and complies with food regulations. Funding supports the National Seafood Inspection Laboratory, which provides an analysis laboratory, data management, and regulatory compliance risk analysis. Voluntary services are also part of the program, and include sanitation evaluation, product inspection and certification, auditing of food quality and safety programs, and training.

### **Aquaculture**

NMFS' mission includes supporting: growth of domestic marine aquaculture to increase the nation's seafood supply, job creation in coastal communities, and restoration of fisheries, marine species, and habitats. Agency activities are guided by the Aquaculture Act of 1980, the 2011 Department of Commerce and NOAA Aquaculture Policies, and the inter-agency 2014 Strategic Plan for Federal Aquaculture Research.

The U.S. is a major consumer of aquaculture products, yet is a minor producer. The Nation imports more than 90 percent of its seafood, of which over half is from foreign-produced aquaculture, while only six percent of the seafood Americans consume is from domestic aquaculture.<sup>5</sup> This reliance on foreign imports moves potential seafood jobs overseas and poses a risk to our Nation's food security.

NMFS is one of three line offices that support NOAA's Marine Aquaculture Program. Each line office has distinct and complementary roles:

- The National Marine Fisheries Service's (NMFS) leads the program and focuses on developing policies, regulations, and science-based "tools for rules" to support efficient management and permitting systems.
- The Office of Oceanic and Atmospheric Research's (OAR) National Sea Grant College Program supports industry development and extension with integrated research and technology transfers primarily through competitive grants.
- The National Ocean Service (NOS) supports development of coastal planning tools to inform siting decisions.

NMFS' activities are led by the Office of Aquaculture and are aligned with four strategic goals:

- 1) Regulatory efficiency: Develop coordinated, consistent, and efficient regulatory processes for the marine aquaculture sector.
- 2) Tools for sustainable management: Encourage environmentally sustainable marine aquaculture using best available science.
- 3) Technology development and transfer: Develop technologies and provide extension services for the marine aquaculture sector.

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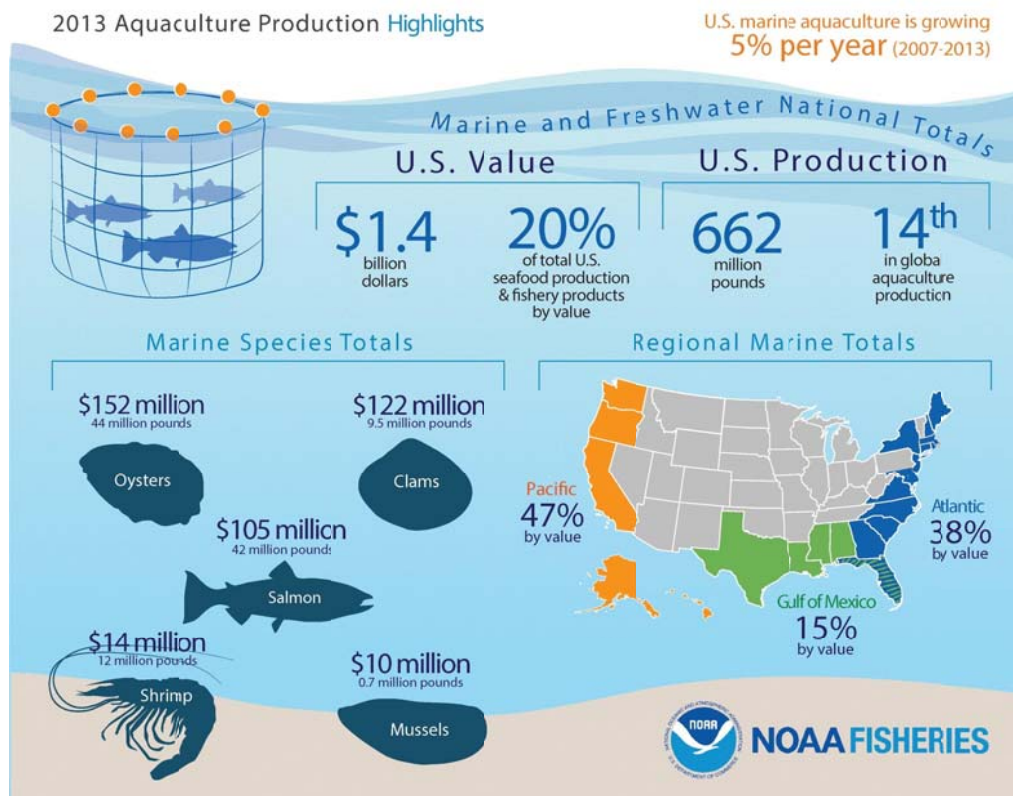
<sup>5</sup> National Marine Fisheries Service (2015) Fisheries of the United States, 2014. U.S. Department of Commerce, NOAA Current Fishery Statistics No.2014. Available at: <https://www.st.nmfs.noaa.gov/Assets/commercial/fus/fus14/documents/FUS%202014%20FINAL.pdf>



4) Informed public: Improve public understanding of marine aquaculture.

U.S. marine aquaculture production has grown at an average annual rate of five percent per year over the last five years<sup>6</sup>, supporting more jobs in coastal communities (see figure below). This expansion is a result, in part, of the investments and efforts of NOAA and its partners. Examples of specific results include:

- An improved regulatory environment for marine aquaculture leading to several new permits and the first ever regional management plan for aquaculture in Federal waters, as well as record-high shellfish production in several states;
- Publication of several scientific articles demonstrating that the environmental effects of aquaculture are minimal when responsibly managed;
- Refinement and application of genetic risk assessment models and tools for aquaculture siting, aiding in key management decisions; and
- Advancement of rearing techniques for new aquaculture species with high potential for domestic production (e.g., sablefish).



### Salmon Management Activities

This funding supports research and management activities associated with salmon not listed under the ESA. Funding for the Mitchell Act component supports the operations and maintenance of Columbia River hatcheries through grants and contracts to the states of

<sup>6</sup> National Marine Fisheries Service (2015) Fisheries of the United States, 2014. U.S. Department of Commerce, NOAA Current Fishery Statistics No.2014. Available at: <https://www.st.nmfs.noaa.gov/Assets/commercial/fus/fus14/documents/FUS%202014%20FINAL.pdf>

Washington, Oregon, and Idaho, and to the USFWS, to mitigate the loss of salmon on the Columbia and Snake Rivers. The Pacific Salmon Treaty component funds NMFS and the states of Alaska, Washington, Oregon, and Idaho to provide personnel support to the Pacific Salmon Commission's technical committees and conduct a broad range of salmon stock assessment and fishery monitoring programs required to implement the treaty provisions. These programs are carried out in fisheries and rivers located from southeast Alaska to Oregon, including the Columbia River.

### **Regional Councils and Fisheries Commissions**

NOAA is the sole source of funding for the eight Regional Fishery Management Councils. The Councils were established by the MSA to prepare FMPs aimed at preventing and eliminating overfishing and rebuilding overfished stocks for the Nation's fisheries. The funding is divided among the eight councils and is used for their operating costs (e.g., staff, rent, public meetings, council member salaries, and travel). Funding also supports the activities of the Interstate Marine Fisheries Commissions, and International Fisheries Commissions. Funds provide critical operational support to the commissions and states for development and implementation of sustainable fishery management measures.

### **Interjurisdictional Fisheries Grants**

The Interjurisdictional Fisheries Act of 1986 (IFA) is a formula-based financial assistance program to promote state activities in support of the management of interjurisdictional resources. Any state, either directly or through an interstate commission, may submit a research proposal that supports management of fishery resources that: 1) occur in waters under the jurisdiction of one or more states and in the U.S. Exclusive Economic Zone; 2) are managed under an interstate FMP; or (3) migrate between the waters under the jurisdiction of two or more states bordering on the Great Lakes.

### **Schedule and Milestones:**

#### ***Fisheries and Ecosystem Science Programs and Services (FY 2017–2021)***

- *Economics and Social Science*: Expand implementation of an integrated Bioeconomic Length-structured Angler Simulation Tool, the Social Indicator Toolbox, and FishSET—a spatial economics toolbox; assess the economic performance of fisheries; and predict the cost/benefits of stock rebuilding programs
- *Fisheries Oceanography*: Continue to work with resource managers to provide ecosystem-based science information and trade-off analyses, to inform management decisions for evolving constituent-defined management issues in IEA regions
- *Antarctic Research*: Conduct research surveys to estimate the biomass of Antarctic krill and fishes, continue annual studies and assessments of krill-dependent predators to determine the impacts of krill fishing and climate change, complete stock assessments for 26 targeted stocks, and provide scientific advice to the U.S. Delegation to the Commission for the Conservation of Antarctic Marine Living Resources
- *Climate Regimes and Ecosystem Productivity*: Incorporate long-term observations of climate-related impacts on the Bering Sea ecosystem in integrated ecosystem assessments. Deliver Bering Sea ecosystem forecasts to help living marine resource managers incorporate climate-related impacts into management decisions
- *Information Analysis and Dissemination*: Improve population dynamics/assessment/management model development and data analysis tools to support fisheries science programs and improve data dissemination and sharing of integrated data and analyses (climatology, socio-economic, ecosystem, fishery-dependent, and fishery-independent),

both internally and externally

### ***Fisheries Data Collections, Surveys, and Assessments (FY 2017–2021)***

- *Fisheries Monitoring, Assessment, and Forecasting*: Conduct and expand fishery-independent surveys; develop advanced sampling technologies to enhance data collection for stock assessments; improve timely delivery of fish stock assessments to fishery managers; and further the implementation of the next-generation stock assessment framework
- *Cooperative Research*: Issue awards for cooperative research from the Northeast Research Set-Aside, and the Southeast CRP competitive grants; and conduct cooperative research surveys nationwide
- *MARMAP*: Perform fishery-independent assessments of reef fish abundance and life history characteristics of economically and ecologically important reef fish species in shelf and upper slope waters from Cape Lookout to Cape Canaveral
- *SEAMAP*: Conduct groundfish and plankton surveys in state and Federal waters, inshore and offshore longline surveys, and reef fish surveys in offshore waters

### ***Observers and Training (FY 2017–2021)***

- Provide coverage in 43 fisheries nationwide, with a goal of expanding observer coverage in existing fisheries and implementing new observer programs in fisheries transitioning to catch share management
- Maintain the number of fisheries with adequate or near adequate observer coverage at 38 and the number of sea days observed annually at 78,000
- Coordinate observer program activities at the national level by developing new standards, policies, and procedures to improve observer programs

### ***Fisheries Management Programs and Services (FY 2017–2021)***

- *Illegal, Unreported, and Unregulated (IUU) Fishing*: Address MSA mandates to implement IUU/bycatch identification, monitoring, and certification procedures, and foreign nation capacity building. Submit biennial status reports to Congress
- *Reducing Bycatch*: Develop technological solutions and investigate changes in fishing practices designed to minimize bycatch of fish and protected species
- *Regional Fishery Management Councils Support*: Develop fishery management measures, using public input and the best available science and tools such as ACLs and AMs
- *Electronic Monitoring and Reporting*: Implement EM and ER options in key fisheries identified by 2020
- *National Catch Share Program*: Work with interested Regional Fishery Management Councils to develop and implement new catch share programs and support the use of technology, when appropriate, to improve the cost-effectiveness of catch share programs

### ***Aquaculture (FY 2017–2021)***

- Implement regulations for the Gulf of Mexico FMP for Aquaculture and begin permitting of offshore finfish operations in the Gulf of Mexico
- Advance Science Center research to support environmentally sound aquaculture practices such as genetics and tools for aquaculture siting
- Research sustainable aquaculture feeds
- Develop science-based tools for management that ensure the efficient review of aquaculture permit applications

### ***Salmon Management Activities (FY 2017–2021)***

- Support the operations and maintenance of Columbia River hatcheries to mitigate the loss of fish production due to hydropower dams
- Conduct a broad range of salmon stock assessment and fishery monitoring programs in the Snake and Columbia Rivers

### ***Regional Councils and Fisheries Commissions (FY 2017–2021)***

- Continue to revise FMPs and amendments to prevent overfishing, rebuild overfished fisheries, and promote sustainability
- Complete socioeconomic analyses for fishery management actions
- Work with Councils to implement electronic technologies for fishery monitoring

### **Deliverables:**

#### ***Fisheries and Ecosystem Science Programs and Services (FY 2017–2021)***

- *Economics and Social Science:* Assessments of the benefits/cost-effectiveness of fisheries rebuilding programs, habitat and protected species recovery programs, and decision support tools; and, improved quantitative models for conducting benefit-cost analyses and predicting how fishery participants will respond to changes in management measures
- *Ecosystem Science:* Update new ecosystem-status reports and risk and vulnerability assessments delivered to resource managers in the IEA regions. Delivery of environmental indicators and predicted impacts on managed species to appropriate stock assessment scientists and Regional FMCs through the FATE program
- *Antarctic Research:* Stock assessments for 26 targeted stocks of krill, fishes, and crabs managed by the CCAMLR
- *Climate Regimes and Ecosystem Productivity:* Expanded survey information for five commercial fish stocks and four protected species stocks
- *Information Analysis and Dissemination:* Technical expertise and capacity infrastructure for data collection, processing, sharing, and archiving for Integrated Ocean Observing System, NOAA Environmental Data Management Committee, NMFS Enterprise Data Management, NMFS Fisheries Information Systems, NMFS Marine Recreational Information Program, and GeoSpatial One Stop

#### ***Fisheries Data Collections, Surveys, and Assessments (FY 2017–2021)***

- *Fisheries Monitoring, Assessment, and Forecasting:* Fishery-independent surveys to provide ongoing data for stock assessments; stock assessment reports based on a next-generation stock assessment framework for key stocks; and more precise estimates of recreational catch through improved surveys
- *Cooperative Research:* Individual project final reports of the results, with data archived at the Fisheries Science Centers and added to the NMFS InPort Centralized documentation (metadata) repository
- *MARMAP:* Fishery-independent assessments of reef fish abundance and life history characteristics of economically and ecologically important reef fish species in shelf and upper slope waters from Cape Lookout to Cape Canaveral; resulting data provided for use in stock assessments and in support of other research and management needs
- *SEAMAP:* Surveys in inshore and offshore waters conducted and fishery, habitat, biological, and environmental data provided to Regional Councils for incorporation into regional species stock assessments and for development of effective fisheries and habitat management strategies

### ***Observers and Training (FY 2017–2021)***

- Information on catch, bycatch, discards, and biological data necessary for in-season monitoring and stock assessments. Also information on fishing effort, fishing gear, and specific fishing techniques that minimize bycatch
- Annual reports and biennial updates to the National Bycatch Report that was first published in September 2011; an online update was published in 2013 and a second update is scheduled in January 2016. The next comprehensive report is scheduled in 2017

### ***Fisheries Management Programs and Services (FY 2017–2021)***

- Development of fisheries regulations and FMPs and amendments in order to maintain and restore productive stocks important to commercial, recreational, tribal, and subsistence fisheries
- Analysis and research to identify, consult, and certify nations whose vessels engage in IUU fishing, bycatch of Protected Living Marine Resources (PLMR) and of certain shark catches on the high seas. May also result in recommendations to the Secretary of Commerce, after coordination with other Federal agencies, on possible fishery-product trade prohibitions and port restrictions on nations whose vessels engage in the above
- Improvements in fishing gear and fishing practices that allow fishermen to avoid ending fishing seasons early, and avoid protected species interactions that can close fishing seasons or entire fisheries as a result of bycatch
- Implementation of cost-effective electronic technology applications that complement observer coverage, improve data collection and analysis, and lower the economic and time burden on fishermen for compliance with recordkeeping and reporting regulations

### ***Aquaculture (FY 2017–2021)***

- Report on interagency efforts to establish a coordinated permitting system for Federal waters
- Reports on research and development to support environmentally sound aquaculture practices
- Permits issued for aquaculture operations in the Gulf of Mexico and in other regions in Federal waters
- Application of science-based tools for management that ensure the efficient review of aquaculture permit applications

### ***Salmon Management Activities (FY 2017–2021)***

- Maintenance of salmon smolt production as required under the Mitchell Act
- Broad range of salmon stock assessment and fishery monitoring programs in the Snake and Columbia Rivers

### ***Regional Councils and Commissions (FY 2017–2021)***

- Draft amendments to FMPs
- Collection and analysis of socioeconomic data on the impacts of fishery management actions

**Performance Goals and Measurement Data:**

***Fisheries and Ecosystem Science Programs and Services***

<b>Performance Measure:</b> Number of Antarctic fish assessments	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	26	26	26	26	26	26	26
<p><b>Description:</b> This measure tracks the 26 stocks of Antarctic krill, finfishes, and crabs in order to quantify the functional relationships between krill, finfishes, their environment, and their predators. Total fish assessments will depend on the availability of capable vessels. This work supports the U.S. Antarctic Marine Living Resources Convention Act, which requires directed scientific research to achieve objectives of the Conservation of Antarctic Marine Living Resources.</p>							

<b>Performance Measure:</b> The number of Federally managed fisheries with electronic monitoring technology in place (cumulative)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	5	7	9	12	14	14	14
<p><b>Description:</b> NMFS will work with the Councils and the Highly Migratory Species (HMS) Advisory Panel to identify the appropriate fisheries for electronic monitoring technology, and increase the number with implemented electronic monitoring systems each year. Electronic monitoring improves data collection and analysis, and makes it faster and cheaper for fishermen to comply with recordkeeping and reporting regulations.</p>							

**Fisheries Data Collections, Surveys, and Assessments**

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Revised percentage of FSSI stocks with adequate population assessments and forecasts (Indicator 3.4b)	64.8% (129/ 199)	61.3% (122/ 199)	64.3% (128/ 199)	64.8% (129/ 199)	64.3% (128/ 199)	64.3% (128/ 199)	64.3% (128/ 199)
<p><b>Description:</b> This measure tracks the percentage of FSSI fish stocks for which adequate assessments are available. Assessments are vital to determine the scientific basis for supporting and evaluating the impact of fishery management actions. To be deemed adequate, assessments must be based on recent quantitative information sufficient to determine current stock status (abundance and mortality) relative to established reference levels, and to forecast stock status under different management scenarios.</p>							

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Number of cooperative research projects conducted annually ( <i>Cooperative Research</i> )	54	54	54	54	54	54	54
<p><b>Description:</b> Annual number of research projects, conducted in partnership with stakeholders such as recreational and commercial fishermen or universities, which collect fundamental fisheries information to support the development and evaluation of management options.</p>							

### Observers and Training

<b>Performance Measure:</b> Fisheries with adequate observer coverage	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	38	38	38	38	38	38	38
<b>Description:</b> Total number of fisheries with adequate observer coverage as defined in the FMP. While 53 fisheries currently have observer programs, the number of fisheries with adequate or near adequate observer coverage are dependent on funding, fishing effort, changes in management and/or regulations, and observer program priorities. Managers face difficulty accurately managing fisheries and protected species without the critical data provided by observers. In addition, inadequate observer coverage may prevent commercial fisheries from being opened.							

<b>Performance Measure:</b> Number of sea days observed	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	80,000	78,000	78,000	78,000	78,000	78,000	78,000
<b>Description:</b> These values represent the total number of observer days at sea. Observers collect catch and bycatch data to inform a range of conservation and management issues. Some sea days are industry-funded; however, they still rely on Federal funding to occur.							

### Fisheries Management Programs and Services

<b>Performance Measure:</b> Fish Stock Sustainability Index (Indicator 3.4a) (cumulative)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	761.5	758	768.5	780.5	789.5	796	797
<b>Description:</b> NMFS measures the performance of U.S. Federal fisheries through the Fish Stock Sustainability Index (FSSI). The FSSI is an index of sustainability for domestic commercial and recreational fish stocks in the U.S. The index is comprised of 199 stocks, representing 85 percent of the total catch of all stocks. These 199 fish stocks were selected for their importance to commercial and recreational fisheries, including considerations of economic, ecological, and social value. The index is scored on a 1,000 point scale, with each stock given a score between 0 and 4 (0=status unknown, 4=meets all sustainable fishing criteria). The FSSI increases when NMFS determines that the status of a stock has improved; it is either no longer subject to overfishing, is no long overfished, its biomass has increased at least 80 percent of target, or is rebuilt. These are all factors that contribute to sustainably managed fisheries. For more information: <a href="http://www.nmfs.noaa.gov/sfa/fisheries_eco/status_of_fisheries/fssi.html">http://www.nmfs.noaa.gov/sfa/fisheries_eco/status_of_fisheries/fssi.html</a>							



<b>Performance Measure:</b> Percent of stocks for which catch is below the specified annual catch limit (ACL) (cumulative)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	89.7%	81%	82%	83%	84%	86%	88%
<p><b>Description:</b> This measure tracks the percentage of fish stocks that are below their annual catch limit (ACL). The use of ACLs has been successful in ending and preventing overfishing, as stock assessments have shown the number of stocks subject to overfishing continuing to decline. Performance is measured by comparing the final annual catch estimate to the ACL for each stock that has an ACL. If the final annual catch estimate for the stock is less than the ACL, NMFS will report that the stock is below its ACL. For information: <a href="http://www.nmfs.noaa.gov/sfa/management/acls_ams/index.html">http://www.nmfs.noaa.gov/sfa/management/acls_ams/index.html</a></p>							

## PROGRAM CHANGES FOR FY 2017:

### **Fisheries and Ecosystem Science Programs and Services: Ecosystem-based Solutions for Fisheries Management (Base Funding: \$143,361,000 and 595 FTE;**

**Program Change: +\$5,929,000 and 0 FTE)**: NOAA requests an increase of \$5,929,000 and 0 FTE for a total of \$149,290,000 and 595 FTE for an integrated, cross-Line Office initiative to improve stewardship and resilience efforts related to inshore ecosystems and the living resources and the human communities that depend on them. NMFS proposes to fill habitat science gaps to improve the understanding of ecological connections between the fisheries and protected species that occur offshore, and the inshore coastal habitats they depend on that are most subject to human disturbance. This initiative will complement the NOAA's National Ocean Service (NOS) proposal "Ecosystem-based Solutions for Coastal Resilience" (page NOS - 45).

#### **Proposed Actions:**

The NMFS and NOS requests recognize that coastal ecosystems (e.g., marshes, dunes, mangroves) serve as habitat for fish and protected species and as physical defense systems for coastal communities, which face increasingly frequent and intense weather and changing ocean conditions. NMFS will map, characterize, and study coastal ecosystems and their connections to fisheries and protected species offshore in order to provide scientific information to support both these habitat goals. This work will inform decision-making, including prioritization of habitat protection or restoration, better identification of essential fish habitat and critical habitat, and appropriate green infrastructure development.

NMFS and NOS will cooperatively select a region or regions to implement this ecosystem science effort. Within the selected region(s) NOAA will develop projects in partnership with local and regional scientists, resource managers, and community decision-makers. The projects will be composed of phased activities beginning with a) foundational research and data collection; b) economic valuation; and c) assessment, modeling and decision support tool development. In addition, NOS will provide support for training, communication, and planning. A coordinated approach ensures each region addresses priority ecosystem science needs and facilitates data sharing to maximize funding available.

This proposal provides the scientific underpinning for sound management of fisheries and protected species through the following NMFS activities:

- **Improve Foundational Inshore Science Information:** NMFS will conduct foundational inshore habitat science (e.g., mapping, biological surveying and monitoring, ecological process studies) using advanced technologies, ship-based surveys, ground-truthed satellite imagery, and shore-based observations. This will include research and external grants on the ecological connections between coastal habitats and offshore ecosystems and living marine resource stocks. Work will be phased in to determine the economic value of the ecosystem services provided by coastal habitats, focusing on commercial and recreational fisheries and related sectors, such as tourism. The data from these activities will feed into Habitat Assessments.<sup>7</sup>

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<sup>7</sup> Habitat assessments consolidate, analyze, and report the best available information on habitat characteristics relative to the population dynamics of fishery species and other living marine resources. Tier 1 habitat assessments are based on existing data; Tier 2 habitat assessments require new data and include habitat-specific information on biomass or abundance (<https://www.st.nmfs.noaa.gov/ecosystems/habitat/publications/haip/index>).

- **Develop Habitat Assessments, Predictive Models, and Decision Support Tools for use by Managers:** NMFS will develop Tier 1 (assess habitat associations using existing information) and Tier 2 (upgrade habitat assessments to minimally acceptable level for all species life stages) habitat assessments. In addition, NMFS will develop models that predict offshore species' responses to inshore habitat, oceanographic, and climatic scenarios. This initiative will enable NMFS to develop or augment existing databases and operational, user-friendly portals with up-to-date habitat data and information for use by scientists and managers. Decision support tools will integrate existing and new habitat data as well as modeling results, for landscape/seascape-scale planning and prioritization of habitat protection or restoration.

This initiative supports the Cross-Agency Priority Goal for Infrastructure Permitting Modernization. The requested funding will provide the scientific basis necessary to better define Essential Fish Habitat and Critical Habitat and lead to more effective resource management.

**Statement of Need and Economic Benefits:**

Fisheries managers need a better understanding of nearshore ecosystems and the effects on fishery resources. When management measures employed in a fishery are not effective at recovering a depleted stock, fishery managers seek to determine what else may be influencing the stock's status, such as habitat changes. This proposal will fill information gaps in habitat science and connections to fisheries management.

Approximately 163 million Americans live near the coast and approximately 89 million people vacation on the coasts every year.<sup>8</sup> According to a report released in March 2014 by the Census Bureau, the U.S. population in the counties directly along the coast experienced a 39 percent increase in population from 1970 to 2010. The population density at the coast is expected to continue increasing into the future, further intensifying the pressures of development on ecologically and economically important areas. Federal, state, and tribal resource agencies; businesses; and coastal communities urgently need fundamental and up-to-date information on: 1) the ecological and economic connections between the fisheries and protected species that occur offshore and the coastal habitats they rely on that are most subject to human disturbance and 2) how these relationships are affected by environmental change. This information is critical to reduce impacts and increase resilience of valuable marine resources and the communities that depend on them. User-friendly decision support tools will also maximize the usage of this new information to implement effective management.

The proposed mapping and advances in habitat science will allow NMFS to quantify the economic benefits of conserving and restoring existing inshore habitats. This information will enable the Agency to include more economic information when prioritizing and justifying future conservation and restoration actions. Support for habitat science has been limited, especially research on the economic and cultural values provided by habitat and the connection between habitat and fisheries production.

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<sup>8</sup> NOAA's 2013 State of the Coast Report: National Coastal Population Report, [http://www.noaanews.noaa.gov/stories2013/20130325\\_coastalpopulation.html](http://www.noaanews.noaa.gov/stories2013/20130325_coastalpopulation.html); U.S. Commission on Ocean Policy: An Ocean Blueprint, 2004, [http://govinfo.library.unt.edu/oceancommission/documents/full\\_color\\_rpt/welcome.html](http://govinfo.library.unt.edu/oceancommission/documents/full_color_rpt/welcome.html)

However, the value of this work can be seen from several recent projects. The annual value of shrimp production in restored salt marsh habitat in Galveston Bay, Texas was estimated at between \$425 and \$690 per hectare.<sup>9</sup> The annual rate of return on the restoration was as high as 5.3 percent, depending on the costs and ecological functions of the specific restoration method. Another example of the economic benefits of habitat science has been demonstrated in a project that mapped the scallop grounds of Browns Bank, Canada. This effort allowed fishermen to more effectively target scallop habitats by dragging within only 25 percent of their previously fished area, which reduced operational expenses, bycatch, and damage to surrounding habitats.<sup>10</sup>

The research, modeling, and management outputs from this initiative will support NOAA's stewardship mandates by better understanding the values of ecosystem services provided by marine habitats and their connections; through this improved understanding, conservation and restoration resources can be prioritized, essential fish habitat and critical habitat can be better defined, and appropriate green infrastructure can be incorporated into development. This will lead NOAA and its partners toward more effective resource management, disaster recovery efforts, redevelopment planning, habitat conservation, and restoration of degraded or storm-damaged ecosystems. Improved socio-economic data, maps, monitoring results, and research on inshore habitats (e.g., estuarine nurseries) and their connections to offshore habitats and stocks, will provide information to support resilient coastal economies and populations of living marine resources.

**Resource Assessment:**

Currently, NOAA has significant in-house expertise and is making modest investments in the habitat science needed to better manage living marine resources and enhance coastal community resilience. Increasing pressure on coastal resources, extreme weather events, and changing ocean conditions necessitate increased emphasis on marine coastal habitat mapping, data collection, and other habitat science activities. Both the NOS and NMFS initiatives will build on and leverage existing programs to achieve desired outcomes.

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<sup>9</sup> Minello TJ, Rozas LP, Caldwell PA, Liese C (2012) A comparison of salt marsh construction costs with the value of exported shrimp production. *Wetlands* 32: 791-799.

<sup>10</sup> Taylor PH (2003) Mapping the undersea landscape: Technologically advanced maps of sea floor habitats are becoming vital tools for ocean management. *Gulf of Maine Times* 7(1) [www.gulfomaine.org/times/spring2003/science\\_insights.html](http://www.gulfomaine.org/times/spring2003/science_insights.html)

**Schedule and Milestones:**

The proposed actions are organized to support three-year projects that rotate among the NMFS regions.

<b>Milestones</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
Study designs and research plans developed for regions receiving funding, in collaboration with NOS	X	X			X
Multibeam sonar, remote sensing, and field surveys for physical and biological characterization and mapping of coastal habitats		X	X	X	X
Oceanographic and ecological research on physical and ecological connections between coastal habitats and offshore ecosystems		X	X	X	X
Research and surveys to quantify contributions of coastal habitats to regional economies and cultures			X	X	X
Oceanographic, ecological, and socio-economic models and tools			X	X	X
Web-based data availability with model syntheses and tools provided to applied scientists and managers of living marine resources, habitats, and the coastal zone, developed in conjunction with NOS			X	X	X

**Deliverables:**

- New and updated habitat characterization maps (including sea floor) providing current and baseline information for use by fisheries, protected resources, and coastal zone managers
- Information on contributions of coastal habitats to offshore fisheries and protected species production
- Increased habitat valuation information for understanding the economic contributions of coastal habitats to offshore fisheries and protected resources and the coastal communities that depend on them
- Knowledge of anthropogenic and climate change impacts on habitat and species use (e.g., effects of water level changes or other loss of habitat, poleward migration of species, etc.) to be used for fisheries and coastal management
- Tier 1 and Tier 2 habitat assessments and models that predict offshore fishery species responses to inshore habitat, oceanographic, and climatic scenarios
- Decision-support tools for use by coastal, fisheries, and protected resource managers using oceanographic, ecological and socio-economic models
- User-friendly, web-based data portals for dissemination of habitat science data and information

**Performance Goals & Measurement Data:**

<b>Performance Measure:</b> Number of Tier 1 habitat assessments	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	3	4	4	4	4
<b>Without Increase</b>	2	2	2	2	2	2	2
<b>Description:</b> Tier 1 habitat assessments use existing information to analyze and report on habitat characteristics relative to the population dynamics of fishery species and other living marine resources. The assessments focus on habitats related to the 199 stocks of the Fish Stock Sustainability Index and provide fishery managers with a basic level of information critical to effective resource conservation.							

<b>Performance Measure:</b> Number of Tier 2 habitat assessments	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	0	1	2	4	4
<b>Without Increase</b>	0	0	0	0	0	0	0
<b>Description:</b> Tier 2 habitat assessments are based on new or expanded data collection and research to analyze and report on habitat characteristics relative to the population dynamics of fishery species and other living marine resources. This includes the production of habitat maps; determination of habitat-specific biomass or abundance; consideration of temporal and spatial variability in habitat use; and development of habitat theory and proxies to apply to data-poor stocks. The assessments focus on habitats related to the 199 stocks of the Fish Stock Sustainability Index and provide fishery managers with previously unavailable data to use in resource conservation decisions.							

<b>Performance Measure:</b> Number of coastal habitats with documented ecological connections to offshore fisheries	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	0	1	3	4	5
<b>Without Increase</b>	0	0	0	0	0	0	0
<b>Description:</b> This performance measure addresses the final scientific products of the biological and physical studies and modeling. Understanding ecological connections to offshore fisheries provides necessary information to NOAA fishery managers and allows them to prioritize and justify decisions for conserving and restoring coastal habitats in terms of living marine resource production.							

<b>Performance Measure:</b> Number of coastal habitats with documented valuation of their ecosystem services	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	0	0	1	2	3
<b>Without Increase</b>	0	0	0	0	0	0	0
<p><b>Description:</b> This performance measure addresses the final scientific product that combines the ecological information with the socio-economic information. Understanding the economic and social value of coastal habitats provides necessary information to NOAA managers and allows them to prioritize and justify decisions for conserving and restoring coastal habitats in terms of societal benefits and economic growth.</p>							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** National Marine Fisheries Service  
**Sub-Program:** Fisheries Science and Management  
**Program Change:** Ecosystem-based Solutions for Fisheries Management

Object Class		FY 2017 Increase	FY 2017 Total Program <sup>11</sup>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$60,915
11.3	Other than full-time permanent	0	1,476
11.5	Other personnel compensation	0	50
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	62,441
12	Civilian personnel benefits	0	18,875
13	Benefits for former personnel	0	32
21	Travel and transportation of persons	300	2,303
22	Transportation of things	20	379
23.1	Rental payments to GSA	0	5,839
23.2	Rental Payments to others	0	2,004
23.3	Communications, utilities and miscellaneous charges (boats)	680	5,506 905
24	Printing and reproduction	0	
25.1	Advisory and assistance services	500	10,460
25.2	Other services	500	4,230
25.3	Purchases of goods & services from Gov't accounts	0	15,747
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	1,000	1,232
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	500	500
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	1,000	3,538
31	Equipment	500	1,991
32	Lands and structures	0	500
33	Investments and loans	0	0
41	Grants, subsidies and contributions	929	12,807
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	1
44	Refunds	0	0
99	Total obligations	5,929	149,290

<sup>11</sup> Due to financial system limitations, the object class detail for the Program reflects the Fisheries and Ecosystem Science Programs and Services PPA.



**Fisheries and Ecosystem Science Programs and Services: Distributed Biological Observatory (Arctic) (Base Funding: \$2,054,000 and 11 FTE; Program Change: +879,000 and 0 FTE):** NOAA requests an increase of \$879,000 and 0 FTE for a total of \$2,933,000 and 11 FTE for NMFS' Climate Regimes & Ecosystem Productivity to implement a Distributed Biological Observatory (DBO) to detect climate and human-induced change on Arctic ecosystems.

**Proposed Actions:**

NOAA will implement a Distributed Biological Observatory (DBO), an array of sensors designed to determine biophysical responses, to detect climate and human-induced change on Arctic ecosystems. NMFS is continuing support of OAR-led Arctic observations to monitor biological responses to dramatic environmental changes, such as seasonal retreats and thinning of sea ice and record-setting seawater temperatures (see OAR Regional Climate Data and Information: NOAA Arctic Research Program: Arctic Observing Network, OAR - 42). The DBO is designed to detect changes in nutrients, productivity, and biological abundances and diversity, along a latitudinal gradient extending from the northern Bering Sea to the Chukchi and Beaufort Seas. The overarching goal of the DBO is to expand standardized ocean sampling to eight regions within this area. This data is crucial for increased understanding of changing Arctic ecosystems and the impacts on resources.

The NOAA Arctic Observing Network initiated a collaborative pilot DBO program in 2010 with a focus on two regions. The partnership with other Federal agencies, academia, and international partners improved our understanding of how climate and human-induced change are affecting the environment. This collaboration demonstrated the utility of the DBO sampling protocol, with annual review of data facilitated through the international Pacific Arctic Group<sup>12</sup>. The DBO leverages existing interagency investments under the auspices of the Interagency Arctic Research Policy Committee's 2013-2015 science plan.<sup>13</sup> The requested increase supports additional data sampling and analysis, improved modeling, a data workspace and visualization portal, and data archiving at the Earth Observing Laboratory. These new DBO elements will increase data quantity and quality. In addition, this work will provide much needed visualization products showing regional responses to physical and ecological changes, which can be used by researchers from world-wide science programs and as outreach tools to a multitude of regional and national stakeholders.

**Statement of Need and Economic Benefits:**

Commercial fishing in Alaska, a \$6.7 billion industry, accounts for nearly half the total fish and shellfish catch in the U.S.<sup>14</sup> In the U.S. Arctic, fishing is currently concentrated in the Bering Sea. The North Pacific Fisheries Management Council has closed the Arctic Management Area in U.S. waters in the Beaufort and Chukchi Seas. Fishing north of the Bering Sea cannot be authorized until after NOAA has the scientific data needed to sustainably manage the fisheries. If increasing temperatures and changing ocean conditions shift distribution of some fish species into the Beaufort and Chukchi Seas, this could result in greater interest by U.S. commercial fishermen in moving operations north for economic reasons. However, NOAA needs to understand the shifts and impacts of climate change and human activity on Arctic resources prior to opening the area to commercial harvest.

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<sup>12</sup> <http://pag.arcticportal.org/>

<sup>13</sup> <http://www.iarpcollaborations.org/teams/Distributed-Biological-Observatory>

<sup>14</sup> "The Economic Value of the Alaska Seafood Industry." Value inflated for 2014 dollar values. <http://pressroom.alaskaseafood.org/wp-content/uploads/2013/08/AK-Seafood-Impact-Report.pdf>

**Resource Assessment:**

Since 2000, NOAA and its partners have provided approximately \$500,000, with additional leveraged funding from the Bureau of Ocean Energy Management, to test a pilot DBO's value to science and research in the northern Bering, Chukchi and Beaufort Seas. The pilot DBO program has provided baseline information supportive of fundamental ecosystem research in a region of rapid climate change. OAR obtains atmospheric, oceanic, and sea ice observations; conducts research on Arctic climate change; and develops models to create a more holistic understanding of Arctic ecosystem status and trends. NMFS Office of Science and Technology and Alaska Fisheries Science Center coordinates national and international DBO activities and delivers scientific analysis necessary for the conservation, management, and utilization of the region's living marine resources. In order to improve the utility of the collected data, greater investments are needed for analysis, data management, and outreach.

**Schedule and Milestones:**

<b>Milestones</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>
Sample DBO stations in 8 regions for sustained ecosystem observations in Chukchi and Beaufort Seas	X	X	X	X
DBO data QA/QC, visualization, archiving and integration with international programs	X	X	X	X

**Deliverables:**

- Sampling in eight DBO regions, with periodically updated evaluations of variability and change in the context of increased anthropogenic activity
- Annual NOAA updates that summarize DBO information for broad distribution in international publications such as NOAA's Arctic Report Card

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Results from DBO sampling reported annually for integration into scientific models/meetings/symposia and to support the work of interagency and NOAA studies	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	8	8	8	8	8
<b>Without Increase</b>	0	0	0	0	0	0	0
<p><b>Description:</b> A set of results are generated from each sampling region. Results are then integrated into scientific models. Current annual sampling effort and integration of results into models is constrained by funding and the capability to collaborate effectively with international partners. Proposed new efforts will coordinate sampling in 8 DBO regions and support collaboration with national and international partners. Additionally, results of the sampling will be disseminated via NOAA's Arctic Report Card, pertinent scientific meetings, and public symposia.</p>							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Program:** National Marine Fisheries Service  
**Sub-program:** Fisheries Science and Management  
**Program Change:** Distributed Biological Observatory (Arctic)

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program<sup>15</sup></b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$60,888
11.3	Other than full-time permanent	0	1,476
11.5	Other personnel compensation	0	50
11.7	Special personnel services payments	0	0
11.9	Total personnel compensation	0	62,414
12	Civilian personnel benefits	0	18,867
13	Benefits for former personnel	0	32
21	Travel and transportation of persons	0	2,002
22	Transportation of things	0	359
23.1	Rental payments to GSA	0	5,836
23.2	Rental Payments to others	0	2,003
23.3	Communications, utilities and miscellaneous charges	479	5,303
24	Printing and reproduction	0	905
25.1	Advisory and assistance services	0	10,456
25.2	Other services	0	3,728
25.3	Purchases of goods & services from Gov't accounts	0	15,303
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	231
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	3,537
31	Equipment	0	990
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	400	12,273
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	1
44	Refunds	0	0
99	Total obligations	879	\$144,240

<sup>15</sup> Due to financial system limitations, the object class detail for the Program reflects the Fisheries and Ecosystem Science Programs and Services PPA.

**Observers and Training: Observers and Training (Base Funding: \$44,058,000 and 150 FTE; Program Change: +\$1,095,000 and 0 FTE):** NOAA requests an increase of \$1,095,000 and 0 FTE for a total of \$45,153,000 and 150 FTE for the Observers and Training program to provide accurate and timely information and analyses on the biological, economic, and social aspects of the Nation's fisheries resources.

**Proposed Actions:**

Observer programs will continue to provide coverage in approximately 48 fisheries nationwide. NMFS will use the increase to fund approximately 1,000 additional sea days of observer coverage in U.S. fisheries. In order to increase the amount of fisheries with adequate coverage funding will support development of the following:

- Data necessary for management of the Nation's fisheries, including information to support management of marine mammals and other protected species;
- Information on catch, bycatch, discards, and biological data necessary for in-season monitoring and stock assessments;
- Information on fishing effort, fishing gear, and specific fishing techniques that minimize bycatch;
- Information to increase compliance with specific regulations;
- Contracts needed to hire observers through independent observer provider companies;
- Information needed to support other specified science and management programs; and
- Biological information needed for age and growth studies and genetic analyses of threatened or endangered sea turtle populations.

The goal of observer programs is to provide accurate and timely information and analyses on the biological, ecological, economic, and social aspects of the Nation's fisheries resources. The scientific data collected by observer programs are critical inputs for population assessments of threatened and endangered species such as sea turtles, seabirds, and marine mammals, and for effective management of the Nation's fish stocks.

The additional anticipated 1,000 sea days will augment observer coverage in 12 regional fishery observer programs, although some observer programs may only be in the pilot phase or collecting baseline levels of coverage. The total number of observed fisheries in FY 2015 was 53, 38 of which had adequate or near adequate coverage. Of these 38 fisheries, 19 are in the Greater Atlantic, eight are off Alaska, six are off the West Coast, three are off the Southeast, and two are off the Pacific Islands. NOAA estimates that 42 fisheries will have adequate coverage in 2017, up from 38 in 2015. Some programs that will benefit from additional sea days include the Gulf of Maine shrimp trawl, South Atlantic reef fish fishery, and the California halibut trawl fishery. Improved coverage will allow some of these fisheries with inadequate observer coverage to transition to adequate coverage, helping to ensure sustainable fisheries. The National Observer Program (NOP) will allocate the additional 1,000 sea days based on recommendations from the NOP Advisory Team (NOPAT). The NOPAT is formed of representatives from all regional fishery observer programs as well as other NMFS offices and the U.S. Coast Guard.

**Statement of Need and Economic Benefit:**

Observer programs are established under Fishery Management Plans adopted by regional fishery management councils for various fisheries and require specified levels of observer coverage. Without minimum levels of observer coverage some fisheries are not permitted to open to commercial fishing. Improved catch and bycatch data from observer programs inform stock assessments and reduce scientific uncertainties for fish abundance estimates and

overfishing limits. This reduced uncertainty may lead to higher annual catch limits, longer fishing seasons, and increased community stability.

**Resource Assessment:**

Managers face difficulty accurately managing fisheries and protected species without the critical data provided by observers. In addition, inadequate observer coverage may prevent commercial fisheries from being opened. NMFS supports the NOP which coordinates the observer programs. NOP support includes improvements to data collection and data quality procedures, observer training and support, outreach and education, program reviews, and policy development including health and safety policy, as well as international collaboration and support for regional observer programs. Additionally, the national and regional observer programs support important work to transition the use of electronic technologies, such as electronic reporting and electronic monitoring, from research to operation.

**Schedule and Milestones:**

FY 2017 – 2021:

- Implement observer programs in 53 fisheries across all regions to meet statutory and regulatory requirements under the MSA, MMPA, and ESA for observer coverage in U.S. commercial fisheries. This work also addresses critical science and management needs for catch and discard estimates as well as stock assessments
- Increase number of fisheries with adequate observer coverage to 42

**Deliverables:**

FY 2017 – FY 2021:

- Observer coverage totaling approximately 79,000 sea days observed annually in 53 fisheries across all regions to achieve 42 fisheries with adequate or near adequate observer coverage
- Data necessary for management of the Nation’s fisheries, including information to support management of protected species such as sea turtles, marine mammals, and sea birds
- Information on catch, bycatch, and biological data necessary for in-season monitoring and stock assessments
- Information to increase compliance with specific regulations

**Performance Measures:**

<b>Performance Measure:</b> Fisheries with adequate observer coverage (annual)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With increase</b>	N/A	N/A	42	42	42	42	42
<b>Without increase</b>	38	38	38	38	38	38	38
<b>Description:</b> Total number of fisheries with adequate observer coverage as defined in the FMP. While 53 fisheries currently have observer programs, the number of fisheries with adequate or near adequate observer coverage are dependent on funding, fishing effort, changes in management and/or regulations, and observer program priorities. Managers face difficulty accurately managing fisheries and protected species without the critical data provided by observers. In addition, inadequate observer coverage may prevent commercial fisheries from being opened.							

<b>Performance Measure:</b> Number of sea days observed (annual)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With increase</b>	N/A	N/A	79,000	79,000	79,000	79,000	79,000
<b>Without increase</b>	80,000	78,000	78,000	78,000	78,000	78,000	78,000
<b>Description:</b> These values represent the total number of observer days at sea. Observers collect catch and bycatch data to inform a range of conservation and management issues. Some sea days are industry-funded; however, they still rely on Federal funding to occur.							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** National Marine Fisheries Service  
**Sub-program:** Fisheries Science Programs and Services  
**Program Change:** Observers and Training

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$14,447
11.3	Other than full-time permanent	0	101
11.5	Other personnel compensation	0	106
11.7	Special personnel services payments	0	64
11.9	Total personnel compensation	0	14,718
12	Civilian personnel benefits	0	4,655
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	470
22	Transportation of things	0	131
23.1	Rental payments to GSA	0	1,440
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	707
24	Printing and reproduction	0	186
25.1	Advisory and assistance services	1,095	18,127
25.2	Other services	0	85
25.3	Purchases of goods & services from Gov't accounts	0	98
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	806
31	Equipment	0	109
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	3,621
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	1,095	45,153



**Fisheries Management Programs and Services: National Catch Share Program: (Base Funding: \$25,219,000 and 65 FTE; Program Change: +\$2,505,000 and 0 FTE):** NOAA requests an increase of \$2,505,000 and 0 FTE for a total of \$27,724,000 and 65 FTE in the National Catch Share Program to develop and implement new catch share programs and strengthen NMFS capabilities to put catch share infrastructure efficiencies in place. These changes will provide an opportunity to improve the economic and ecological quality of certain fisheries and increase accuracy and timeliness of information and analysis on the biological, ecological, and socio-economic aspects of the Nation's fisheries resources.

**Proposed Actions:**

NMFS has 16 programs under catch share management. The request will support activities for development of new catch share programs as well as implementation and operational efforts, after Council approval. The increase would be used to support development and implementation of the Gulf of Alaska Trawl Bycatch Management and Gulf of Mexico Charter Red Snapper and Headboat Reef Fish catch share programs. Activities include NCSP management at the national and regional levels and social and economic data collection or analysis, as well as establishment of catch share program accounting databases and reporting systems, administration, at-sea and dockside monitoring, and science evaluation.

Each catch share program is unique with its own set of regional and local economic and ecological issues; however, there are tools that, if developed on a national level, will eliminate redundancies in programs, encourage more consistent data and data collection practices, and increase efficiencies that will help programs to improve performance. The implementation of these efficiencies will reduce the costs to NMFS and industry over time. With this proposed funding, NMFS expects to increase the number of key objectives of catch share programs met from 16 to 32 by FY 2020 (see description of key objectives in the performance data section below). Achieving objectives demonstrates the success of the catch share program in improving the ecological and economic health of that fishery.

**Statement of Need and Economic Benefits:**

Implementing a catch share program results in long-term economic and ecological benefits, such as the Gulf of Mexico red snapper fishery where the inflation adjusted ex-vessel price has increased by 44 percent and the value of the fishery has more than doubled from \$10.1 million in 2007 to \$23.0 million in 2014<sup>16</sup>. Catch share is a general term for several fishery management strategies that allocate a specific portion of the total allowable fishery catch to individuals, cooperatives, communities, or other entities. Each recipient of a catch share is directly accountable to cease fishing when its specific quota is reached. The term includes specific programs defined in law, such as limited access privilege (LAP) and individual fishing quota (IFQ) programs. While catch share programs are not new, Congress (in its 2006 amendments to the Magnuson-Stevens Act), as well as national experts have recognized that catch shares are an important management tool that should be available for use in any fishery.

Catch share programs have been used in the U.S. since 1990 and now include 16 different fisheries from Alaska to Florida managed by six different Councils. Additional fisheries are in the process of considering catch share programs as part of their management plans. Both here and in other countries catch shares have shown they can effectively achieve annual catch limits, reduce the negative biological and economic impacts of the "race for fish," and when properly designed can eliminate overfishing and result in safer and more profitable fisheries while also

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<sup>16</sup> 2014 Gulf of Mexico Red Snapper IFQ Annual Report ([http://sero.nmfs.noaa.gov/sustainable\\_fisheries/ifq/documents/pdfs/annual\\_reports/2014\\_rs\\_annualreport.pdf](http://sero.nmfs.noaa.gov/sustainable_fisheries/ifq/documents/pdfs/annual_reports/2014_rs_annualreport.pdf)), pages 28, 31.

addressing other social objectives. The requested increase will improve NMFS ability to develop and implement catch share programs and support some fisheries in more easily realizing the benefits of catch share management.

**Resource Assessment:**

The funding within the National Catch Share Program budget line supports activities and capabilities that support development of catch share programs, as well as the implementation and operations of specific catch share programs—including Northeast Sectors, Pacific Trawl ITQ, Gulf of Mexico Grouper/Tilefish, Alaska Halibut Sportfish. Additional information on the Catch Share program can be found in the Fisheries Management Programs and Services narrative.

**Schedule and Milestones:**

FY 2017 – 2021:

- Work with regional councils to develop up to 3 new catch share programs
- Work with regional councils to implement new catch share programs and improve existing programs

**Deliverables:**

FY 2017 – 2021:

- Implement reporting systems, where appropriate, to reduce costs while maintaining data quality
- Implement up to three new catch share programs, depending on Fishery Management Council action, 1 in the North Pacific and 2 in the Gulf of Mexico
- Implement improvements requested by industry and the Councils in the Pacific Trawl ITQ, Gulf of Mexico red snapper and grouper/tilefish, Northeast Sector, and Alaska catch share programs
- Continue assessments of the economic and social impacts of catch share management options and current policies on fishery participants, firms, and communities
- Ensure the continuation of economically and ecologically sustainable fishing communities in a manner consistent with the goals of the MSA and each Council's fishery management plan objectives

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Number of key objectives met by catch share programs	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	19	20	23	32	32
<b>Without Increase</b>	16	16	19	20	20	20	20
<p><b>Description:</b> The four key objectives, below, are expected outcomes of implementing catch share programs, which demonstrate improvements in the ecological and economic health of that fishery. Each objective is measured for each catch share program (i.e., 1 program would score 4, 2 programs would total 8, etc., if all the objectives are achieved for each new catch share program). The key objectives that are tracked for catch share programs implemented in 2010 or later are:</p> <ul style="list-style-type: none"> <li>Increased revenue per vessel*</li> <li>Increased or full utilization of target species*</li> <li>Decreased bycatch*</li> <li>ACL not exceeded</li> </ul> <p>*Changes will be determined by comparing the performance under the catch share program with the average performance prior to implementation of the catch share program. NMFS must wait until the first year of a program is complete in order to analyze the data and determine whether objectives have been achieved.</p>							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** National Marine Fisheries Service  
**Sub-program:** Fisheries Science and Management  
**Program Change:** National Catch Share Program

Object Class	FY 2017 Increase	FY 2017 Total Program <sup>17</sup>
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$45,765
11.3 Other than full-time permanent	0	991
11.5 Other personnel compensation	0	33
11.7 Special personnel services payments	0	143
11.9 Total personnel compensation	0	46,932
12 Civilian personnel benefits	0	14,179
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	1,568
22 Transportation of things	0	187
23.1 Rental payments to GSA	0	3,472
23.2 Rental Payments to others	0	616
23.3 Communications, utilities and miscellaneous charges	0	2,281
24 Printing and reproduction	0	675
25.1 Advisory and assistance services	0	8,145
25.2 Other services	2,005	6,393
25.3 Purchases of goods & services from Gov't accounts	0	16,656
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	166
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	2,260
31 Equipment	500	2,184
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	14,625
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	2,505	\$120,339

<sup>17</sup> Due to financial system limitations, the object class detail for the Program reflects the Fisheries Management Programs and Services PPA.

**Fisheries Management Programs and Services: Management of Fair Trade (Base Funding: \$117,834,000 and 444 FTE; Program Change: +\$1,556,000 and 0 FTE):** NOAA requests an increase of \$1,556,000 and 0 FTE for a total of \$119,390,000 and 444 FTE to improve detection of illegal, unreported, and unregulated (IUU) fishing and seafood fraud following recommendations of the Presidential Task Force on Combating IUU Fishing and Seafood Fraud.

This requested increase, along with the funds requested within the Enforcement Program, supports the Action Plan for Implementing the IUU Task Force recommendations. The plan identifies actions that will strengthen enforcement; create and expand partnerships with state and local governments, industry, and non-governmental organizations; and create a risk-based traceability program to track seafood from harvest to point of entry into U.S. commerce. Actions include the use of existing traceability mechanisms to combat IUU fishing and seafood fraud, as well as the operational standards related to collecting, verifying and securing those data.

**Proposed Actions:**

IUU fishing is a global problem that impacts the survival of protected species, undermines government efforts to sustainably manage marine resources, and unfairly impacts law-abiding seafood businesses. Consumers and seafood buyers are seeking assurances associated with food safety and sustainability. This request supports a seafood traceability program that tracks seafood from harvest to point of entry into U.S. commerce. Traceability is a critical tool for combating IUU fishing that maintains food safety, verifies sustainability claims, and ensures products are caught or farmed legally and not mislabeled. This program is a key step in leveling the playing field for legal fishermen. Creating an information system that better facilitates data collection, sharing, and analysis among relevant regulators and enforcement authorities would be a significant step forward in addressing IUU fishing and seafood fraud.

The requested funds will be used to successfully advance the implementation of the seafood traceability program in FY 2017. The increase will enhance seafood import traceability, as well as agency port security responsibilities under the SAFE Ports Act, by improving NMFS' capacity to audit shipments entering the U.S. commerce network. NMFS will improve IT data systems that are critical to the data collection, sharing and analysis of species data. Funds will also be used to enhance the data collection methods used for the International Trade Data System (ITDS). ITDS is a "single window" system that allows businesses to communicate with U.S. Customs and Border Protection (CBP) and its Partner Government Agencies (including NMFS) when importing and exporting goods, eliminating the often duplicative and paper-based processes used previously. With ITDS, companies submit their information electronically, and the data elements can then be quickly and efficiently retrieved and used by the Federal agencies that require them. Data at the border are currently collected both in electronic and hard copy formats. Hard copies are often scanned and then stored for future use. Use of the ITDS will not only simplify the collection of data by using an electronic format, but will also ensure shared use of information between all Federal agencies.

NMFS will develop additional ITDS business rules necessary to enhance evaluation of incoming shipments for IUU fishing or seafood fraud. Funds will also support initiation of auditing selected shipments identified by the updated ITDS. NOAA's Seafood Inspection Program will audit the document trail with the number of shipments verified increasing over the years as the ITDS system is implemented and refinements are made.

**Statement of Need and Economic Benefit:**

Global losses attributable to IUU fishing are estimated to be \$10 to \$23 billion annually<sup>18</sup>. IUU weakens profitability for legally caught seafood, fuels illegal trafficking operations, and undermines economic opportunity for legitimate fishermen. Species substitution to hide these IUU activities, an act of seafood fraud, further confounds tracking and enforcement. The economic loss attributed to seafood fraud is unknown but even small elevations in price add up to large losses for retailers and consumers. As stated in the Presidential Memorandum, “Establishing a Comprehensive Framework to Combat Illegal, Unreported, and Unregulated Fishing and Seafood Fraud,” it is in the Nation’s interest to promote sustainable fishing practices, combat seafood fraud, and end the sale of IUU fishing products. In particular, establishing a seafood traceability program for certain imports marks a watershed moment in U.S. fishery management. Because the U.S. imports over 90 percent of the seafood it consumes – valued at \$18 billion for edible fishery products<sup>19</sup> - ensuring a level playing field is paramount given the investments and sacrifices that have been made to give U.S. consumers confidence in the safety and sustainability of U.S. domestic fisheries. As the U.S. increases its enforcement against IUU products and seafood fraud, commensurate domestic tracking of seafood landings is also required; otherwise the U.S. risks challenges in the WTO for unfair trade practices.

**Resource Assessment:**

At present, NOAA has limited resources to combat IUU fishing in the context of current domestic fishing regulations and requirements under the Magnuson-Stevens Act. Current resources are not sufficient to address the broader mandates articulated in the Presidential Memorandum, “*Establishing a Comprehensive Framework to Combat Illegal, Unreported, and Unregulated Fishing and Seafood Fraud*” and new regulations and legislation that address IUU fishing, seafood fraud, traceability, and wildlife trafficking.

**Schedule and Milestones:**

FY 2017-2021

- Support trade and certification staff
- Establish technical trade support office in China
- Develop and implement specific business rules within ITDS to identify high-risk shipments

**Deliverables:**

- Source data on seafood imports
- Documentation for enforcement activities

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<sup>18</sup> Agnew, David J., John Pearce, Ganapathiraju Pramod, Tom Peatman, Reg Watson, John R. Beddington, and Tony J. Pitcher. “Estimating the worldwide extent of illegal fishing.” PLoS One 4, no. 2 (2009): e4570.

<sup>19</sup> National Marine Fisheries Service (2015) Fisheries of the United States, 2014. U.S. Department of Commerce, NOAA Current Fishery Statistics No.2014. Available at: <https://www.st.nmfs.noaa.gov/Assets/commercial/fus/fus14/documents/FUS%202014%20FINAL.pdf>

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Number of shipments reviewed per month (cumulative)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	120	220	320	380	420
<b>Without Increase</b>	N/A	N/A	0	0	0	0	0

**Description:** Number of shipments of imported fishery products whose traceability documentation are reviewed per month which is a fraction of the total number of shipments of seafood into the U.S. The numbers in the table above are shipments that are randomly chosen to audit the document trail, eventually to point of harvest. Discrepancies found are investigated and the information used for intelligence on the supply chain as well as a means to determine what must be done to strengthen the audit and evaluation process.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** National Marine Fisheries Service  
**Sub-program:** Fisheries Science and Management  
**Program Change:** Management of Fair Trade

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$45,767
11.3	Other than full-time permanent	0	991
11.5	Other personnel compensation	0	33
11.7	Special personnel services payments	0	143
11.9	Total personnel compensation	0	46,934
12	Civilian personnel benefits	0	14,179
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	40	1,608
22	Transportation of things	0	187
23.1	Rental payments to GSA	0	3,472
23.2	Rental Payments to others	0	616
23.3	Communications, utilities and miscellaneous charges	0	2,281
24	Printing and reproduction	0	675
25.1	Advisory and assistance services	0	8,145
25.2	Other services	1,516	5,904
25.3	Purchases of goods & services from Gov't accounts	0	16,654
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	166
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	2,260
31	Equipment	0	1,684
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	14,625
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	1,556	119,390



**Aquaculture: Support for Domestic Seafood Production and Jobs through Aquaculture (Base Funding \$6,381,000 and 20 FTE; Program Change: +\$1,525,000 and 0 FTE):** NOAA requests an increase of \$1,525,000 and 0 FTE for a total of \$7,906,000 and 20 FTE to conduct research and regulatory activities that support sustainable aquaculture development. This proposal will increase the U.S. seafood supply, create jobs, and increase trade opportunities by helping to develop a robust and sustainable U.S. marine aquaculture industry.

**Proposed Actions:**

Domestic aquaculture provides an alternative livelihood for coastal communities, including fishermen, and year-round commerce in coastal regions that have limited economic opportunities. Supporting the development of sustainable marine aquaculture in the U.S. can also help meet the growing demand for seafood. The requested funding to support the growth of U.S.-sourced seafood will allow NMFS to develop, test, and transfer the results of aquaculture research to the seafood industry in a manner that benefits the Nation's economy and creates new jobs.

The requested funds will be used to develop a coordinated, consistent, and efficient regulatory process for the marine aquaculture sector. Specific activities include:

- Developing and implementing new permitting programs and issuing permits for offshore waters. Note that NMFS recently published a final regulation to establish a comprehensive offshore aquaculture regulatory system for the entire Gulf of Mexico. This is the first system of its kind in the U.S. Permit request submissions are expected to start in FY 2016.
- Working with states and Federal partners to streamline permitting in coastal waters (e.g., improving the permitting process for shellfish aquaculture under national and state shellfish initiatives).

The funding will also be used to conduct research to develop, refine, and apply science-based tools for sustainable management of the marine aquaculture sector including:

- Modeling to assess and avoid impacts of commercial operations on sensitive habitats and protected species, inform site selection of new aquaculture operations, predict genetic impacts on wild fish populations, and minimize disease.
- Collaborating with partners on pilot-projects to validate and test technologies.
- Implementing management approaches to ensure readiness for commercial applications.

**Statement of Need and Economic Benefits:**

Domestic marine aquaculture is poised to emerge as a significant provider of seafood and coastal jobs over the next several years. The U.S. currently imports over 90 percent of its seafood (by value), over half of which is a product of aquaculture.<sup>20</sup> While other countries have successfully supported aquaculture development, production in the U.S. has lagged behind resulting in a greater reliance on imported seafood. Despite having the largest EEZ in the world, the U.S. currently ranks 15th globally in aquaculture production, behind smaller countries.<sup>21</sup>

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<sup>20</sup> National Marine Fisheries Service (2015) Fisheries of the United States, 2014. U.S. Department of Commerce, NOAA Current Fishery Statistics No.2014. Available at:

<https://www.st.nmfs.noaa.gov/Assets/commercial/fus/fus14/documents/FUS%202014%20FINAL.pdf>

<sup>21</sup> FAO. 2014. The State of World Fisheries and Aquaculture 2014. Rome. 223 pp: <http://www.fao.org/fishery/sofia/en>

Seafood supply and security is becoming an increasingly high priority for the private sector, as major aquaculture producing nations, such as China, are demanding more of their own seafood. As a result, industry leaders are calling for more government support of domestic aquaculture. Concurrently, offshore aquaculture operations are set to come online for the first time, raising novel management considerations. NOAA needs additional resources to manage and foster the sustainable development of the industry consistent with objectives described in the NOAA and DOC 2011 Aquaculture Policies.

Without additional resources requested, there is a significant risk that aquaculture companies will continue to avoid investing in the U.S. in favor of other nations. For example, Panama and Mexico have recognized aquaculture's contribution to the seafood supply of coastal economies and have encouraged investment through efficient permitting and partnering on research and development. A Hawaii-based open-ocean operation that was permitted for U.S. operations has since dissolved and a new company created in its place, with the plan to locate its farm off Mexico and export to the United States. The CEO was quoted as saying that there is too much red tape in the U.S. He stated he couldn't talk to his board of investors when there is a lack of clear regulations and a burdensome monitoring process in the U.S. He finds the Mexican process to be rigorous but streamlined.<sup>22</sup>

#### **Resource Assessment:**

The resources for this activity are described in the Aquaculture narrative.

#### **Schedule and Milestones:**

FY 2017-2021:

- Implement the Gulf of Mexico Fishery Management Plan for Aquaculture
- Streamline regulation and permitting for sustainable aquaculture in coastal and offshore waters, especially for shellfish farms
- Ensure the efficient review of aquaculture permit applications via a suite of science based tools for management
- Expand the National Shellfish Initiative to support coastal shellfish aquaculture and restoration activities

#### **Deliverables:**

FY 2017-2021:

- Seafood produced from US marine aquaculture increased by 50% by the year 2020, resulting in part from actions taken to support industry development by NMFS and its partners
- Aquaculture related jobs created mainly in coastal communities<sup>23</sup>
- Permits issued for aquaculture in Federal waters in the Gulf of Mexico
- Efficient and coordinated interagency system for Federal permitting for marine aquaculture operations, reducing review times from years to months

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<sup>22</sup> Watson, J. (2015). Projects stall after feds allow fish farming in open ocean. Associated Press. Retrieved from: <http://bigstory.ap.org/article/1e3dd10ed1a3446cab2e48bf2feba2f/projects-stall-after-feds-allow-fish-farming-open-ocean>

<sup>23</sup> Estimates of job creation potential for aquaculture have been estimated in Knapp, Gunnar, "Salmon Farming Employment," Oct 2013 (in preparation) and Knapp, Gunnar, "Potential Impacts of U.S. Offshore Aquaculture In Offshore Aquaculture in the United States: Economic Considerations Implications and Opportunities," 2008. NOAA Aquaculture Program. page 172. Application of estimates from these studies show that at full implementation of the Gulf of Mexico FMP for Aquaculture alone (production at MSY of 64 million pounds annually) would likely create between 1500 and 3000 direct and indirect jobs, with the potential for as many as 15,000 direct and indirect jobs.

- Programmatic NEPA and other documents to streamline review of permits
- A suite of science-based management tools to support sustainable marine aquaculture (e.g., tools to avoid protected resource interactions, benthic impacts, interaction with wild stocks, etc.)

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Number of offshore Federal sites permitted for marine aquaculture (cumulative)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	7	9	11	14	15
<b>Without Increase</b>	3	4	6	7	8	8	9
<b>Description:</b> Estimates are based on Southeast Region projections and personal communication with Regional Coordinators. The three Federal permits issued in FY 2015 are as follows: two in Massachusetts for mussel aquaculture (Salem State University and Scott Lindell Marine Biological Laboratory) and one in California for mussel aquaculture (Catalina Sea Ranch).							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**

**(Dollar amounts in thousands)**

**Budget Program:** National Marine Fisheries Service  
**Sub-Program:** Fisheries Science and Management  
**Program Change:** Support for Domestic Seafood Production and Jobs through Aquaculture

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$2,216
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	21
11.7	Special personnel services payments	0	0
11.9	Total personnel compensation	0	2,237
12	Civilian personnel benefits	0	633
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	97
22	Transportation of things	0	5
23.1	Rental payments to GSA	0	66
23.2	Rental Payments to others	0	13
23.3	Communications, utilities and miscellaneous charges	0	41
24	Printing and reproduction	0	21
25.1	Advisory and assistance services	0	1,548
25.2	Other services	775	830
25.3	Purchases of goods & services from Gov't accounts	0	586
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	375	833
31	Equipment	375	547
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	449
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	1,525	\$7,906

**APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES**  
**SUB-PROGRAM: ENFORCEMENT**

NOAA's Office of Law Enforcement (OLE) is the only conservation enforcement program (Federal or state) exclusively dedicated to Federal fisheries and marine resource enforcement. OLE enforces NOAA's natural resource protection laws and improves compliance with Federal regulations to conserve and protect our Nation's living marine resources and their natural habitat. OLE protects and monitors the world's largest exclusive economic zone including 13 National Marine Sanctuaries, and four Marine National Monuments (Figure 1).



Figure 1. NOAA Office of Law Enforcement's Jurisdiction

OLE enforces more than 35 Federal statutes and international agreements related to living marine resources in order to protect marine fisheries, wildlife, and habitat and ensure these global resources are available for future generations to use and enjoy (Figure 2). OLE's work supports the National Marine Fisheries Service's (NMFS') core mission mandates of maximizing productivity of sustainable fisheries and fishing communities; and the protection, recovery, and conservation of protected species. OLE provides direct support for enforcement activities in the NMFS headquarters' Offices of Sustainable Fisheries and Protected Resources, NMFS Regional Offices, and the National Ocean Service's (NOS) Office of National Marine Sanctuaries.



Figure 2. NOAA Enforcement Efforts by Law in 2014

NOAA's Enforcement Program supports critical collaborations and leverages Joint Enforcement Agreements with 27 coastal states and territories, and partnerships with other Federal agencies such as the U.S. Coast Guard. OLE refers enforcement cases that document violations to NOAA's Office of General Counsel or the U.S. Department of Justice for review and potential prosecution under their jurisdiction.

NOAA cannot meet the mandate to end overfishing without OLE's efforts. These efforts ensure that the millions of people who enjoy and rely on these marine resources understand and comply with the regulations necessary to ensure their sustainability and allow fair competition now and for future generations. OLE supports two objectives:

- (1) Enforce laws and regulations that govern:
  - a. commercial fisheries,
  - b. international and interstate commerce in marine resources, and

- c. human interactions with marine mammals and threatened and endangered species.
- (2) Protect resources within designated sanctuaries, marine monuments, and protected areas.

To address these mission requirements, OLE implements four primary methods:

- (1) Traditional enforcement such as investigations and patrols.
- (2) Partnerships with state and Federal agencies.
- (3) Technological tools such as Vessel Monitoring Systems.
- (4) Outreach and education strategies designed to increase and enhance voluntary compliance with environmental laws and regulations.

One example of where OLE is successfully employing this suite of enforcement methods is in the actions taken to support a healthy striped bass population in the Mid-Atlantic region. The Atlantic striped bass (*Morone saxatilis*) has formed the basis of one of the most important fisheries on the Atlantic Coast for centuries. According to the Atlantic States Marine Fisheries Commission, overfishing and poor environmental conditions led to the collapse of the Atlantic striped bass fishery in the 1980s. The Atlantic Coastal Fisheries Cooperative Management Act was issued to ensure the sustainability of the species by setting restrictions on fishing for Atlantic striped bass in the U.S. Exclusive Economic Zone (EEZ).

NOAA's OLE raised awareness of these regulations and increased targeted enforcement efforts to protect the species from illegal poaching activities. OLE joined state and Federal marine law enforcement organizations in a focused enforcement effort, targeting vessels illegally retaining and fishing for striped bass in the EEZ. OLE built on these efforts by providing valuable and informative messages to the public and the media. The office put together a proactive outreach plan with online messaging, social media posts, and text messages. During the first month of the fisheries closure alone, the social media posts went viral, and the webstory was viewed over 1,084 times, picked up by 12 external websites and further distributed through the networks of the Atlantic States Marine Fisheries Commission, and NMFS Regional Offices. These efforts proved an effective way for NOAA to reach people and share the information they need to ensure voluntary compliance.

Major components of the Enforcement budget line include:

*Enforcement and Surveillance:*

NOAA's Enforcement Program ensures compliance with marine natural resource laws using enforcement tools designed to encourage people to meet their legal obligations, both domestically and internationally. NOAA's special agents and enforcement officers work to deter, detect, investigate, and document any violations of Federal laws and regulations. NOAA's approach to fisheries enforcement emphasizes compliance assistance. OLE assists regulated parties in understanding and complying with fishery regulations through contact during monitoring and inspections, and increases public awareness and understanding of enforcement goals and objectives through participation in community meetings, trade shows, and on-the-dock informational visits. Personal interactions between enforcement officers and the community have proven effective in maintaining dialog on often complex regulations, and allow NOAA's investigative efforts and subsequent prosecution to focus on cases that go beyond misunderstandings and/or clerical errors.

This program responds to inquiries and requests for assistance from a variety of industry and public stakeholders, covering a broad range of issues related to fisheries and marine

mammals. The capabilities associated with deterring violations and investigating egregious cases are critical elements in NOAA's enforcement approach. Most commercial and recreational fishermen comply with conservation measures, and OLE's role is to ensure fair competition and a level playing field. In recent years, additional investments in the Enforcement Program have been made to strengthen NOAA's efforts to detect and deter Illegal, Unreported and Unregulated (IUU) fishing and enforce restrictions on imports of illegally-harvested and improperly-documented seafood.

*Cooperative Agreements with States:*

The Cooperative Enforcement Program leverages the resources of coastal state and U.S. territorial marine conservation law enforcement agencies to provide direct support for the Federal enforcement mission. These partners execute Joint Enforcement Agreements with NOAA to support Federal enforcement efforts near shore and at sea, as well as provide land-based monitoring and inspection activities. Since 2001, OLE has capitalized on this approach as a way to address challenges associated with the geographic jurisdiction, the breadth of laws and regulations within NOAA's stewardship responsibilities, the amount of regulated commercial activity (fishing and both domestic and international trade), and the amount of recreational use of the marine environment. This cooperative program allows OLE to concentrate on the investigation and resolution of more serious violations by integrating monitoring and inspection activities for Federal requirements with the work of state/territorial enforcement partners and the U.S. Coast Guard. In FY 2013, these partnerships directly provided 232,378 hours of labor, increasing the number of hours dedicated to Federal marine conservation enforcement activities by a factor of 10 compared to what NOAA could have accomplished alone.

*Vessel Monitoring System:*

The Vessel Monitoring System (VMS) is a satellite-based technology program for remote monitoring of fishing vessels at sea. The program supports a growing number of regulations that require vessels to report in the VMS, and it allows OLE to monitor compliance and track violators over vast expanses. The VMS data serve as valuable evidence and are vital to NMFS' scientific community and fisheries managers. This communications system remotely reports vessel positions and provides an infrastructure for the communication of electronic monitoring data. Efficiencies realized by this electronic monitoring method and the data it produces are a significant advance to NOAA's at-sea monitoring efforts. VMS is a cost-effective way to help enforce protected areas, fishing quotas, actual landings, and several Federal natural resources, environmental, and species conservation laws. Prior to VMS implementation, the only methods used to police protected areas were surface and air patrols, which are costly and do not provide the round-the-clock coverage provided by VMS.

*Implementation of the High Seas Driftnet Fisheries Enforcement Act:*

The High Seas Driftnet Fisheries Enforcement Act sets U.S. policy to enforce the United Nations' worldwide moratorium on large-scale driftnet fishing beyond the exclusive economic zone of any nation. Renegade large-scale high seas driftnet fishing indiscriminately kills massive amounts of fish and other marine life such as whales and turtles with enormous nets suspended for miles in open water. The practice is universally condemned because it is a significant threat to ocean ecosystems and to the food and economic security of nations that rely on fishery resources. The Act provides for denial of port privileges to and import sanctions against nations whose vessels and/or nationals are determined to be conducting illegal driftnet activities and who do not take corrective action. OLE conducts investigation and enforcement required to prosecute and deter these illegal actions. Additionally, NOAA participates in scientific research as part of a multi-national cooperative marine ecosystem research program

on driftnet-affected species. The results of this research reduce uncertainty in population assessments for these species and inform related fishery management and enforcement decisions.

**Schedule and Milestones:**

OLE measures outputs in terms of incidents (documentation of possible violations) initiated, man-hours of patrol for monitoring and inspection work, and man-hours of outreach to the regulated community and the public.

During FY 2017, OLE plans to:

- Continue to advance enforcement and compliance assistance efforts in support of NOAA’s Office of Law Enforcement Operational Priorities
- Finalize the hiring and deployment of enforcement personnel at strategic Ports of Entry
- Establish consistent international IUU enforcement training and technical assistance

**Deliverables:**

FY 2017–2021

- Execution of 27 Joint Enforcement Agreements annually with the Cooperative Enforcement Program’s state and U.S. territory partners
- Monitoring of and compliance assistance to approximately 4,450 vessels under the VMS requirements of 23 fisheries management plans, two international convention areas, and the Papahānaumokuākea National Monument
- Review of progress toward and determine next set of strategic 5-year national and regional Operational Enforcement Priorities
- Advance IUU training course for NOAA, Federal, state, and territory partners based on the FY 2016 Pilot

**Performance Goals and Measurement Data:**

**Enforcement**

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Investigations	3,768	2,250	2,325	2,400	2,400	2,400	2,400
<b>Description:</b> Total number of civil and criminal investigations initiated to identify those responsible for violations and to support the effective prosecution of violations of Federal marine resource law.							



<b>Performance Measure:</b> Man hours of patrol, monitoring, and inspections	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	25,564	30,450	39,575	48,700	48,700	48,700	48,700
<b>Description:</b> Total number of hours spent on patrol, monitoring, and inspections in areas of regulated activity to deter or detect violations of resource protection laws.							

<b>Performance Measure:</b> Man hours of outreach	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	11,941	15,600	18,000	20,400	20,400	20,400	20,400
<b>Description:</b> Total number of hours spent on outreach to educate the public and those involved in regulated commercial activity of Federal marine resource laws, rules, and regulations.							

## PROGRAM CHANGES FOR FY 2017:

**Enforcement: Expanding NOAA's Cooperative Enforcement Program (Base Funding: \$69,840,000 and 237 FTE; Program Change: + \$1,018,000 and 0 FTE):** NOAA requests an increase of \$1,018,000 and 0 FTE for a total of \$70,858,000 and 237 FTE to strengthen state and territorial partners' capabilities in support of high priority Federal enforcement actions, including IUU, seafood fraud, marine protected areas, and wildlife trafficking.

This increase, along with Fisheries Management Programs and Services: Management of Fair Trade request, supports the Action Plan for Implementing the IUU Task Force recommendations. The plan identifies actions that will strengthen enforcement; create and expand partnerships with state and local governments, industry, and non-governmental organizations; and create a risk-based traceability program to track seafood from harvest to point of entry into U.S. commerce. Actions include the use of existing traceability mechanisms to combat IUU fishing and seafood fraud, as well as the operational standards related to collecting, verifying and securing those data.

### **Proposed Actions:**

The requested increase is for the CEP's Joint Enforcement Agreements (JEAs) with state and U.S. territory partners to enhance enforcement of Federal laws and regulations. This increased JEA funding will support joint operations to enforce import restrictions on illegally-harvested and improperly-documented seafood and marine resources. The funds will be distributed to existing and new partners in operational areas that include key strategic ports of entry (places where imported goods may lawfully enter a country). OLE will initiate new CEP partnerships for key strategic ports of entry without current partnerships.

### **Statement of Need and Economic Benefits:**

In recent years, NOAA has invested increasing resources to detect and deter Illegal, Unreported and Unregulated (IUU) fishing and enforce import restrictions on illegally-harvested and improperly-documented seafood. Global losses attributable to IUU fishing are estimated to be between \$10.0 and \$23.0 billion annually<sup>24</sup>, weakening profitability for legally caught seafood, fueling illegal trafficking operations, and undermining economic opportunity for legitimate fishermen in the U.S. and food security in the developing world. NOAA is working to place new enforcement staff in key strategic areas to target high priority imports and major ports of entry including the U.S. border areas. This request will further expand on NOAA's FY 2016 efforts to develop and implement an IUU/International fisheries enforcement training program for Federal, state and territorial enforcement partners.

CEP aims to increase living marine resource conservation, while strengthening state and territorial enforcement resources. OLE agents and officers leverage the program's JEA partnerships to conduct joint operations at the state, local, and international levels, focusing on those illegal activities having the greatest negative impact on Federally managed fisheries, endangered species, marine protected areas, and other protected habitats. Partnerships with these enforcement agencies are vital to ensuring routine dockside monitoring and inspections, and at-sea patrols. OLE strengthens its active presence, visibility, and routine interactions with the regulated industry through these partnerships. By

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<sup>24</sup> Agnew DJ, Pearce J, Pramod G, Peatman T, Watson R, et al. (2009) Estimating the Worldwide Extent of Illegal Fishing. PLoS ONE 4(2): e4570. doi:10.1371/journal.pone.0004570

prioritizing agreements with partners in key strategic areas for IUU imports, NOAA will strengthen the inspection resources necessary to detect and deter these violations including adding partnership coverage for IUU in states where OLE has not had any presence in the past.

**Resource Assessment:**

NOAA’s CEP activities are funded through the Enforcement budget line and the resources identified in this request would provide additional and new partnership opportunities for enforcement support at strategic ports of entry.

**Schedule and Milestones:**

FY 2017 – 2021:

- Identify and establish partnership at strategic ports of entry with existing and/or new JEA partners
- Provide enforcement training, technical assistance, and support to partners through NOAA’s Cooperative Enforcement Program

**Deliverables:**

FY 2017 – 2021:

- Establish Joint Enforcement Agreements with identified partners

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Man hours of patrol, monitoring, and inspections	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	39,575	51,200	51,200	51,200	51,200
<b>Without Increase</b>	25,564	30,450	39,575	48,700	48,700	48,700	48,700

**Description:** Total number of hours spent on patrol, monitoring, and inspections in areas of regulated activity to deter or detect violations of resource protection laws.

*Note:*

- *This measure accounts for all of OLE’s patrol, monitoring, and inspection hours. The increase in performance “with increase” demonstrates the hours performed as part of the joint operations element of this request.*
- *The delayed increase in targets “with increase” from FY 2017 to FY 2018 is due to the fact that JEA funding cycles do not correspond directly to Federal fiscal years. JEA cycles run summer to summer which align with many state funding cycles. As a result, JEAs supported by FY 2017 appropriations will not be initiated until late in FY 2017 (i.e., Summer 2017), at the earliest. As a result, funded activities that provide measurable impact occur in the next fiscal year (i.e., FY 2018).*

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** National Marine Fisheries Service  
**Sub-program:** Enforcement  
**Program Change:** Expanding NOAA's Cooperative Enforcement Program

Object Class	FY 2017 Increase	FY 2017 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$26,557
11.3 Other than full-time permanent	0	74
11.5 Other personnel compensation	0	180
11.7 Special personnel services payments	0	93
11.9 Total personnel compensation	0	\$26,904
12 Civilian personnel benefits	0	10,524
13 Benefits for former personnel	0	1
21 Travel and transportation of persons	0	584
22 Transportation of things	0	97
23.1 Rental payments to GSA	0	2,120
23.2 Rental Payments to others	0	879
23.3 Communications, utilities and miscellaneous charges	0	660
24 Printing and reproduction	0	
25.1 Advisory and assistance services	0	140
25.2 Other services	1,018	26,518
25.3 Purchases of goods & services from Gov't accounts	0	1,050
25.4 Operation and maintenance of facilities	0	
25.5 Research and development contracts	0	624
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	0
31 Equipment	0	0
32 Lands and structures	0	434
33 Investments and loans	0	293
41 Grants, subsidies and contributions	0	0
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	30
44 Refunds	0	0
99 Total obligations	1,018	70,858

## **APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES**

### **SUB-PROGRAM: HABITAT CONSERVATION AND RESTORATION**

The mission of the Habitat Conservation and Restoration sub-program is to protect and restore habitat to sustain commercial and recreational fisheries, recover protected species, and maintain resilient coastal ecosystems and communities, under the following primary mandates: Magnuson-Stevens Act (MSA), Federal Power Act, Energy Policy Act of 2005; Endangered Species Act; Oil Pollution Act; and Comprehensive Environmental Response, Compensation and Liability Act.

Healthy habitat provides significant and essential ecosystem, community, and economic benefits. Habitat is the foundation for resilient fisheries and fishing-based communities and industries, as well as key to supporting and recovering endangered and threatened species. In 2012, the U.S. commercial and recreational saltwater fishing industries generated more than \$199 billion in sales and supported 1.7 million jobs.<sup>25</sup>

Coastal communities rely on healthy habitat for a wide variety of additional socio-economic needs including, recreation, tourism, and as natural infrastructure that protects life and property by reducing effects of storm damage, erosion, and coastal flooding. The nation's ocean and coastal resources annually provide non-market value (e.g., storm surge protection, wildlife viewing, beach visits, snorkeling) of over \$100 billion. Habitat conservation projects often also result in improved infrastructure (e.g., new or modified bridges, culverts, agricultural levees), enhance public safety (e.g., removal of obsolete dams that have become safety hazards), and support a diversified coastal economy.

However, we are facing continued widespread loss and deterioration of vital habitats for managed fisheries, as well as threatened and endangered species. This substantial habitat loss is also increasing risks to communities and the economy from coastal storms, droughts, and other extreme weather. For example, we are losing coastal wetlands—prime nurseries for many species—at the rate of about 80,000 acres per year. This rate of loss is 20,000 more acres per year than was lost during the 6-year period of 1998–2004. More than 60 percent of coastal rivers and bays are moderately to severely degraded by nutrient runoff, and there are over 6 million barriers to fish passage within the rivers of the United States. In addition, each year as many as 150 oil spills and hazardous substance releases occur across the Nation.

***NOAA Habitat Blueprint:*** NOAA developed the Habitat Blueprint principles to increase the effectiveness of our habitat conservation efforts for the benefit of fisheries, coastal and marine life, and the coastal communities and economies they support. These principles emphasize strengthening internal and external partnerships, implementing habitat conservation for multiple benefits, and focusing work where it can have the greatest impact. In ten Habitat Focus Areas (HFA) across the country, we are bringing together a wide variety of partners to leverage resources and make measurable progress toward discrete habitat-related objectives. (<http://www.habitat.noaa.gov/habitatblueprint/>). To date, NOAA has directly invested over \$5 million in multi-year partnership agreements for projects that support HFA objectives. In response, other sources (including other NOAA programs and external partners) have invested nearly \$39M to advance HFA objectives.

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<sup>25</sup> National Marine Fisheries Service. 2014. Fisheries Economics of the United States, 2012. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS-F/SPO-137, 175p. Available at: <https://www.st.nmfs.noaa.gov/st5/publication/index.html>

**Program Components:** Major components of this Habitat Conservation and Restoration budget line include:

*Sustainable Habitat Management*

NOAA protects healthy habitats from loss and degradation. We conduct thousands of consultations each year with Federal agencies whose proposed actions may affect Essential Fish Habitat of Federally managed species, so actions can be taken that avoid, minimize, or compensate for marine, coastal, and riverine habitat impacts. For example, proposed actions can include construction projects, applications for dredging and filling wetlands, waste discharge permits, and renewable energy proposals. Our unique role and responsibility under the Federal Power Act also requires fish passage at hydropower dams licensed by the Federal Energy Regulatory Commission (FERC). In addition, NOAA identifies and maps locations of deep-sea corals in coordination with other Federal agencies and research institutions through its Deep Sea Coral Research and Technology Program, authorized under the MSA.

Each year, NOAA protects more than 100,000 acres of Essential Fish Habitat from non-fishing impacts. Since 2004, we have opened passage along more than 1,300 miles of streams and rivers that had been blocked by hydropower dams, improving fish passage for Federally listed species (such as Pacific and Atlantic salmon species), numerous managed fish, and species such as river herring that serve as important food sources for offshore commercial and recreational fish stocks. Since 2011, NOAA has mapped more than 110,000 square kilometers of seafloor through deep-sea coral habitat surveys. In addition, over 100,000 square kilometers of seafloor with deep-sea coral habitat have been proposed by fishery management councils for enhanced protection. In 2014, NOAA took action to protect 2,184 of the proposed square kilometers of deep-sea coral in the South Atlantic region.

*Fisheries Habitat Restoration*

The NOAA Restoration Center (RC) works closely with partners to restore injured, degraded, or lost priority coastal, marine, and riverine habitat nationwide. Every year, NOAA responds to as many as 150 oil spills and hazardous substance releases across the Nation through our Damage Assessment Remediation and Restoration Program (DARRP). The NOAA RC leads the restoration planning and implementation for these events (most notably the Deepwater Horizon (DWH) oil spill) as part of NOAA's Natural Resource Damage Assess (NRDA) and Restoration Trustee responsibilities under OPA and CERCLA. The Community-based Restoration Program (CRP) provides technical and financial assistance for the implementation of community-driven habitat restoration. Habitat restoration projects are selected through a competitive solicitation process that leverages substantial investments from partners.

In addition to improving habitat for managed fishery and protected resources, restoration projects support a variety of job types in local communities—including construction workers and project managers working directly onsite—as well as other businesses and professionals who design, engineer, provide materials for, and monitor projects. And, unlike other economic sectors, restoration jobs cannot be outsourced to far-off places. In an Oregon-based study, an average of \$0.80 of every \$1.00 spent on a restoration project stayed in the county where the project was located, and \$0.90 stayed in the state.<sup>26</sup>

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<sup>26</sup> Hibbard, M. and S. Lurie. 2006. "Some Community Socio-Economic Benefits of Watershed Councils: A Case Study From Oregon." *Journal of Environmental Planning and Management* 49: 891-908. *In Oregon's Restoration Economy* <http://www.tandfonline.com/doi/abs/10.1080/09640560600946974>

### Chesapeake Bay Protection and Restoration

The NOAA Chesapeake Bay Office (NCBO) implements NOAA's mandate, authorized by P.L. 107-372, to coordinate agency programs and activities to support the Chesapeake Bay Program, including the Chesapeake Bay Watershed Agreement and Executive Order 13508. NCBO supports targeted restoration, protection, and monitoring of vital habitats and fishery resources; synthesizes and delivers scientific data to support management of oysters, blue crab, striped bass, and other ecologically and commercially important species; provides educators and communities with timely and credible information on the Bay ecosystem; and operates and maintains the Chesapeake Bay Interpretive Buoy System (CBIBS).

As part of NOAA's Habitat Blueprint, NCBO leads the Choptank River Watershed Habitat Focus Area (HFA). One significant result achieved in FY 2015 is the completion of oyster restoration in Chesapeake Bay's Harris Creek (part of the Choptank River Habitat Focus Area). This is considered to be the largest oyster restoration effort ever conducted in the Chesapeake Bay and East Coast. Oysters are filter feeders and help improve water quality in the Bay. Also, oyster reefs provide critical habitat for a range of Chesapeake Bay species, including juvenile and adult blue crabs and finfish.

### **Schedules and Milestones:**

FY 2017–2021

- Develop management options for protecting deep-sea corals in partnership with the Regional Fishery Management Councils and National Marine Sanctuaries
- Participate in the re-licensing process for an estimated 125 hydroelectric projects
- Identify and protect essential fish habitat through consultations and partnerships
- Develop restoration plans, conduct habitat assessments, and implement priority restoration projects critical for NOAA trust resources
- Establish partnerships and leverage resources in selected Habitat Focus Areas under the NOAA Habitat Blueprint framework
- Contribute to major ecosystem restoration efforts, including Chesapeake Bay, Puget Sound, Gulf of Mexico, Great Lakes, and San Francisco Bay/Delta

### **Deliverables:**

FY 2017–2021

- Accurate deep-sea coral habitat distribution maps that allow managers to better protect these biologically rich ecosystems
- Technical guidance and assistance provided to NOAA partners, Federal action agencies, and resource decision-makers to achieve protection and restoration of NOAA trust resources
- Restoration plans reviewed and approved through NRDA public process
- Development of maps and habitat assessments annually to support oyster restoration in the Chesapeake Bay

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Number of habitat acres restored (annually) (Indicator 3.4f)	22,975	23,922	47,300	49,800	50,000	50,000	50,000
Habitat Program acres	8,414	8,522	6,300	7,800	8,000	8,000	8,000
ARRA funded acres <sup>1</sup>	1,949	0	0	0	0	0	0
PCSRF acres <sup>2</sup>	12,688	15,400	41,000	42,000	42,000	42,000	42,000
Overlap <sup>3</sup>	76						

**Description:** NOAA restores habitat areas lost or degraded as a result of development and other human activities, as well as specific pollution incidents and sources. Activities are geared toward NOAA trust resources found across the marine environment, including the Great Lakes region, and are supportive of anadromous species (i.e., species that migrate from the sea to freshwater to spawn). The intent of this measure is to summarize or project the geographic area over which ecosystem function has been or will be improved as the direct result of habitat restoration efforts. This measure does not include restoration conducted through the Species Recovery Grants. Examples of projects that contribute to this measure include hydrologic reconnection of wetlands, shellfish and coral reef restoration, and dam removal and fish passage.

1. Supported with FY 2009 American Recovery and Reinvestment Act (ARRA) funding.
2. Pacific Coastal Salmon Recovery Fund (PCSRF) FY 2016 target represents the expected acres restored from funded projects with an anticipated completion date within the fiscal year. FY 2017–2021 targets are based on formula projections of acres restored based on program appropriations and past program performance.
3. Represents the overlap in habitat acres restored due to jointly funded PCSRF and NOAA Restoration Center projects. These “overlap” acres are included in the PCSRF and Habitat totals, respectively, but deducted from the total number of NOAA habitat acres restored.



<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Number of stream miles made accessible for ocean, coastal, and Great Lakes resources (annually)	910.5	710	600	610	610	610	610
Habitat Program stream miles	496	130	160	160	160	160	160
ARRA funded stream miles <sup>1</sup>	51	0	0	0	0	0	0
PCSRF stream miles <sup>2</sup>	363	580	440	450	450	450	450
Overlap <sup>3</sup>	0.5						

**Description:** This performance measure counts stream miles made accessible for diadromous species (i.e., species that migrate between freshwater and the sea) through restoration projects, fishway prescriptions, or consultations. Projects that contribute to this measure include removal of barriers or impediments such as dams, water control structures, culverts, and impoundments and fish passage projects that support recovery of listed species.

*1. Supported with FY 2009 Recovery and Reinvestment Act (ARRA) funds.*

*2. PCSRF FY 2016 target represents the expected stream miles made accessible from funded projects with an anticipated completion date within the fiscal year. FY 2017–2021 targets are based on formula projections of stream miles based on program appropriations and past program performance.*

*3. Represents the overlap in stream miles due to jointly funded PCSRF and NOAA Restoration Center projects. These “overlap” stream miles are included in the PCSRF and Habitat totals, respectively, but deducted from the total number of NOAA stream miles made accessible.*

## PROGRAM CHANGES FOR FY 2017:

### **Habitat Conservation and Restoration: Increase Consultation and Essential Fish Habitat Implementation Capacity (Base Funding: \$3,500,000 and 8 FTE; Program Change:**

**+\$6,477,000 and + 12 FTE)**: NOAA requests an increase of \$6,477,000 and 12 FTE for a total of \$9,977,000 and 20 FTE for consultations and program implementation mandated by Section 305(b) of the MSA in support of the nearly \$200 billion U.S. commercial and recreational fishing industry.<sup>27</sup> The requested funding will provide the needed capacity for NOAA to work with Federal partners to guide coastal development in a manner that protects vital fish habitat without hindering economic development opportunities, including critical transportation and infrastructure improvements.

This Magnuson-Stevens Fishery Conservation and Management Act (MSA) Essential Fish Habitat (EFH) initiative is part of NOAA's overarching effort to expand capacity to have meaningful, on-the-ground conservation impacts through its consultation mandates, while helping important coastal and marine economic development projects move forward. This initiative is paired with NOAA's request to improve consultation and permitting capacity under the Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA). Together this greatly needed increased capacity will reduce delays and improve review and permitting timeframes for projects that benefit the Nation's economy and create new jobs.

#### **Proposed Actions:**

At its current staffing capacity NMFS is missing opportunities to review hundreds of projects and develop recommendations on how these projects could avoid damage to EFH. EFH includes all types of aquatic habitat—wetlands, coral reefs, seagrasses, rivers—where fish spawn, breed, feed, or grow to maturity. NOAA is facing four emerging large-scale natural resource management and conservation issues that will further challenge the ability to meet MSA consultation and permitting requirements:

- (1) additional consultation and permitting requirements related to the California drought;
- (2) significantly increasing consultation and permitting needs in the Southeast and the Pacific Island regions in response to new coral species listings;
- (3) additional consultation and permitting requirements resulting from Gulf of Mexico restoration activities related to the Deepwater Horizon oil spill; and
- (4) compliance with Executive Order 13604 for Improving Performance of Federal Permitting and Review of Infrastructure Projects and the Fixing America's Surface Transportation Act (FAST Act).

The proposed funding will be used to (a) increase NOAA's capacity by hiring staff and contractors to conduct EFH consultations; and (b) fill critical information gaps to support effective and timely completion of EFH reviews as required by MSA Section 305(b). Consultation activities include extensive coordination. NOAA provides technical assistance, reviews permits, evaluates potential adverse effects to EFH, develops recommendations to avoid or minimize those effects, and engages in post-project implementation monitoring and adaptive management to ensure project improvements are realized.

NOAA will also attain efficiencies by conducting more programmatic consultations, which establish a consistent framework by which individual projects can be planned, authorized, and implemented across larger areas, often at regional or national scales. With the proposed

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<sup>27</sup> National Marine Fisheries Service. 2014. Fisheries Economics of the United States, 2012. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS-F/SPO-137, 175p; Available at: <https://www.st.nmfs.noaa.gov/st5/publication/index.html>

funding, NMFS will also further support the Regional Fishery Management Councils (Councils) with their EFH responsibilities.

This initiative supports the Cross-Agency Priority (CAP) Goal for Infrastructure Permitting Modernization. The requested funding to increase capacity will allow NMFS to reduce delays and improve permitting and review timeframes for projects that benefit the Nation's economy and create new jobs.

**Statement of Need and Economic Benefits:**

Maintaining healthy coastal habitats is critical for ensuring the continued economic value of the \$200 billion fishing industry. From the earliest stages of life through adulthood, commercial and recreational fisheries species and their prey depend on coastal habitats. Both physical degradation and loss of these habitats have diminished their capacity to support healthy fisheries. Approximately 163 million Americans live near the coast and approximately 89 million people vacation on the coasts every year.<sup>28</sup> According to a report released in March 2014 by the Census Bureau, the U.S. population in the counties directly along the coast experienced a 39 percent increase in population from 1970 to 2010. The population density at the coast is expected to continue increasing into the future, further intensifying the pressures of development on coastal habitats.

Consultations are the Federal government's opportunity to support Council actions to sustain and rebuild fisheries by addressing impacts to fish habitat. Section 305(b) of MSA requires Federal action agencies to consult with NOAA on all actions (or proposed actions) authorized, funded, or undertaken by the agency that may adversely affect EFH. Actions may include proposed construction projects, applications for dredging and filling wetlands, waste discharge permits, renewable energy proposals, and other Federal funding and permit activities that may adversely affect EFH. NOAA issues recommendations to avoid, minimize, mitigate, or otherwise offset adverse effects to habitats.

While NMFS conducts these habitat consultations for non-fishing activities, the Councils take action to prevent overfishing and to protect habitat from any adverse fishing impacts (e.g., gear modifications). NMFS is partnering with two Councils to enhance their ability to improve fisheries productivity using habitat protection and restoration. Additional funding is needed to expand the approach in other regions and with additional Councils. NMFS is working with the Mid-Atlantic Council to identify priority habitat areas so NMFS can recognize these areas as being especially important to protect during their consultations. NMFS is also working with the Pacific Council to determine stressors to five fish species and develop strategies to reduce exposure to these stressors through a variety of tools. This work with the Councils will enable fisheries to be more resilient to changes in coastal and ocean habitats due to development, climate change, and other pressures.

As an example of a previous EFH consultation with tremendous beneficial impact, NMFS worked with the U.S. Army Corps of Engineers on an erosion control project requested by the Commonwealth of Massachusetts. The project involved using 500,000 cubic yards of sand and gravel from a 103-acre offshore site in Massachusetts Bay for erosion control on 37 acres of Winthrop Beach. However, the materials would have been moved from an area of the Bay designated as EFH for 26 Federally managed species including Atlantic cod. Atlantic cod is an

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<sup>28</sup> NOAA's 2013 State of the Coast Report: National Coastal Population Report, <http://stateofthecoast.noaa.gov/features/coastal-population-report.pdf>, U.S. Commission on Ocean Policy: An Ocean Blueprint, 2004, [http://govinfo.library.unt.edu/oceancommission/documents/full\\_color\\_rpt/000\\_ocean\\_full\\_report.pdf](http://govinfo.library.unt.edu/oceancommission/documents/full_color_rpt/000_ocean_full_report.pdf)

overfished but economically, ecologically, and culturally significant New England fishery that is valued at more than \$30 million.<sup>29</sup> In order to avoid the negative impacts of the proposed beach nourishment project on sand and gravel EFH for Atlantic cod, NOAA advised the Corps on alternative sources of sand and gravel to implement the project and in the process helped to support recovery efforts for the \$30 million Atlantic cod industry.

NMFS also worked with regulatory and natural resource agencies on a proposed major expansion of a phosphate mine in North Carolina that would have caused the largest single source of wetland loss and alteration in the southeastern United States in several decades. As a result of NMFS' consultative recommendations, the mine expansion will avoid primary fish nursery areas designated as Habitat Areas of Particular Concern as well as pristine bottomland hardwood forests. The project also included the restoration of 8,000 acres of wetlands and the preservation of almost 2,500 more acres. These consultations minimized adverse impacts to EFH without hindering local economies; the phosphate mine is the largest employer in Beaufort County.

In every region, significant staffing shortfalls limit our ability to conduct all needed consultations and associated activities. When NMFS does not do a consultation, the project moves forward without the benefit of recommendations to avoid or minimize the project's impact on EFH. The anticipated consultation workload will significantly increase as a result of the potential Deepwater Horizon settlement in the Southeast Region. NOAA anticipates an unprecedented number of conservation projects—and, therefore, requests for EFH consultations—resulting from the influx of roughly \$14 billion in projects. Restoration and associated consultation activities began in 2015, and could continue for 10 to 20 years. Recommendations provided through EFH consultations will maximize the habitat benefits for fisheries that will result from these projects, including wetland restoration that supports the \$300 million Gulf shrimp fishery.<sup>30</sup>

In California, the severe drought reduces the area available to salmon to reproduce, and habitat protection measures provided through EFH consultations will benefit these vulnerable areas and help recover valuable protected species. In both the Southeast and Pacific Islands regions, the listing of several coral species will greatly increase requirements for consultations under the ESA. Shallow water coral reefs in both regions have been designated as EFH for many years; significant coral expertise from the habitat program is needed to support NOAA's responsibilities. The agency will use an integrated strategy to combine consultations under the ESA and MSA that will leverage data and staff resources to streamline the response to Federal action agencies.

Pre-existing consultation shortfalls already exist due to the current volume of consultation requests that NMFS receives as compared to staff available to meet this existing demand. Diminished staffing capacity severely impedes NMFS' ability to address new demands. This shortfall leads to degradation and loss of the habitats that are the foundation for our Nation's fisheries.

#### **Resource Assessment:**

MSA EFH consultations and program implementation are funded through the Habitat Conservation and Restoration budget line. Approximately \$3.5 million in current resources is used to conduct thousands of required EFH consultations around the Nation each year. This funding protects over 100,000 acres of important fisheries habitats. The program

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<sup>29</sup> Fisheries of the United States, 2012; Available at: <http://www.st.nmfs.noaa.gov/commercial-fisheries/fus/fus12/>

<sup>30</sup> Ibid

supports NOAA habitat staff engagement in the Council process to fulfill the MSA habitat mandate and supports the \$200 billion fishing economy by protecting habitats that are the foundation of healthy fisheries. Current resources are insufficient for meeting the requirements of our MSA mandate, maximizing partnerships with the Councils, and achieving the full economic potential of our Nation's fisheries.

**Schedule and Milestones:**

FY 2017–2021:

- Provide technical assistance, consultation, and authorization services for all Federal agencies' proposed actions
- Develop programmatic consultation mechanisms including integrated consultations with ESA
- Conduct reviews of EFH designations every 5 years as required
- Increase collaboration at the state Commission and Federal Council levels to improve effective management of EFH

**Deliverables:**

FY 2017–2021:

- 500 additional MSA EFH consultations conducted per year
- Four to six projects implemented through partnerships with Councils to develop habitat objectives and strategies for specific stocks and habitats

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Number of coastal and marine habitat acres protected from harmful non-fishing impacts or identified threats (annually)	<b>FY 2015 Actual<sup>1</sup></b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	79,000	79,000	79,000	79,000	79,000
<b>Without Increase</b>	2,377,232 <sup>1</sup>	53,000	53,000	53,000	53,000	53,000	53,000

**Description:**

This measure tracks the number of habitat acres where NOAA’s consultations have reduced or averted impacts from non-fishing activities. Examples of non-fishing activities include dredging and filling wetlands, waste discharge permits, renewable energy proposals, and other Federal activities that may adversely affect essential fish habitat (EFH). An area is considered protected when a habitat threat originally proposed is reduced or averted through NMFS early coordination (as identified in Section 600.920(a)(3) of the Magnuson Stevens Act EFH regulations, application of existing NMFS policy/guidance documents (e.g., programmatic EFH consultation, habitat protection policies, etc.), EFH consultation, Endangered Species Act consultation, Fish & Wildlife Coordination Act consultation, and/or via the National Environmental Policy Act review process).

1. The FY 2015 actual for acres protected includes a very large (over 2 million acres) combined. Essential Fish Habitat/Endangered Species Act Consultation on the Columbia Pacific Bio Refinery Dock Modifications on the Columbia River to expand and upgrade a barge dock, and to address a proposed action for shipping ethanol and crude oil over a large coastal and river area.

**PROGRAM CHANGE PERSONNEL DETAIL**

**Budget Program:** National Marine Fisheries Service  
**Sub-Program:** Habitat Conservation and Restoration  
**Program Change:** Increase Consultation and Essential Fish Habitat Implementation Capacity

<b>Title:</b>	<b>Location</b>	<b>Grade</b>	<b>Number of Positions</b>	<b>Annual Salary</b>	<b>Total Salaries</b>
Fishery Biologist	St. Petersburg, FL	ZP-3	3	\$58,562	\$ 175,686
Fishery Biologist	Honolulu, HI	ZP-3	3	\$59,767	\$ 179,301
Fishery Biologist	Sacramento, CA	ZP-3	1	\$62,686	\$ 62,686
Fishery Biologist	Seattle, WA	ZP-3	1	\$62,486	\$ 62,486
Fishery Biologist	Silver Spring, MD	ZP-3	2	\$63,722	\$ 127,444
Fishery Biologist	Gloucester, MA	ZP-3	3	\$64,020	\$ 192,060
Fishery Biologist	Juneau, AK	ZP-3	2	\$63,963	\$ 127,926
Fishery Biologist	Long Beach, CA	ZP-3	1	\$65,231	\$ 65,231
Subtotal			<u>16</u>		<u>\$ 992,820</u>
2016 Pay Adjustment	1.3%				\$12,907
Total					\$1,005,727
Less Lapse	25%		<u>(4)</u>		<u>(\$251,432)</u>
Total Full-time permanent:			12		\$754,295
2017 Pay Adjustment	1.6%				\$12,069
<b>TOTAL</b>			12		\$766,364

<b>Personnel Data</b>	<b>Number</b>
Full-time permanent	12
Other than full-time permanent	<u>0</u>
<b>Total</b>	12
Authorized Positions:	
Full-time permanent	16
Other than full-time permanent	<u>0</u>
<b>Total</b>	16

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** National Marine Fisheries Service  
**Sub-Program:** Habitat Conservation & Restoration  
**Program Change:** Increase Consultation and Essential Fish Habitat Implementation Capacity

Object Class	2017 Increase	2017 Total Program <sup>31</sup>
11 Personnel compensation		
11.1 Full-time permanent	\$766	\$19,680
11.3 Other than full-time permanent	0	365
11.5 Other personnel compensation	0	193
11.8 Special personnel services payments	0	5
11.9 Total personnel compensation	766	20,243
12 Civilian personnel benefits	232	6,188
13 Benefits for former personnel	0	1
21 Travel and transportation of persons	25	538
22 Transportation of things	0	161
23.1 Rental payments to GSA	0	1,692
23.2 Rental Payments to others	0	285
23.3 Communications, utilities and miscellaneous charges (charter boats)	0	1,063 148
24 Printing and reproduction	0	
25.1 Advisory and assistance services	5,389	11,110
25.2 Other services	0	228
25.3 Purchases of goods & services from Gov't accounts	0	976
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	10
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	26	1,026
31 Equipment	39	249
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	24,472
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	6,477	68,390

<sup>31</sup> Due to financial system limitations, the object class detail for the Program reflects the Habitat Conservation and Restoration PPA.



**Habitat Conservation and Restoration: Coastal Ecosystem Resiliency Grants (Base Funding: \$10,000,000 and 0 FTE; Program Change: -\$10,000,000 and 0 FTE):** NOAA requests a decrease of \$10,000,000 and 0 FTE for a total of \$0 and 0 FTE for Coastal Ecosystem Resiliency Grants in order to consolidate coastal resiliency grants funding in another budget line.

**Proposed Actions:**

NOAA proposes to consolidate funding for coastal resiliency grants by including the funding for this activity in FY 2017 under NOAA's National Ocean Service (NOS). NOS is requesting a total of \$20.0 million to support the Regional Coastal Resilience Grants program under the Coastal Management Grants line (NOS - 63). The initial solicitation for NOAA's resilience grants in 2015 yielded \$151 million in requests, far exceeding the available funding, which indicates a significant unmet need for resilience tools and project implementation nationwide.

The broad objectives of the enhanced, competitive Regional Coastal Resilience Grant (RCRG) program are threefold: 1) to increase the resilience of coastal communities by assisting them in planning for extreme weather events, coastal inundation, climate hazards, changing ocean conditions, and competing uses; 2) to support regional approaches that leverage existing efforts and promote collaboration across jurisdictions and sectors; and 3) work with partners to protect, restore, and enhance habitats that increase the resilience of coastal ecosystems which, in turn, reduce hazards to communities and bolster coastal economies.

NOS and NMFS will coordinate execution of the consolidated resiliency grant funding in a complementary manner to provide coastal communities with technical and financial support. Increased funds will more fully address the significant need and demand for community, ecosystem, and economic resilience efforts in all U.S. coastal regions.

**Performance Goals and Measurement Data:**

The performance for the consolidated Coastal Ecosystem Resiliency grants is reflected under the NOS budget section (NOS - 67).

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** National Marine Fisheries Service  
**Sub-Program:** Habitat Conservation & Restoration  
**Program Change:** Coastal Resiliency Ecosystem Grants

Object Class	2017 Decrease	2017 Total Program <sup>32</sup>
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$18,914
11.3 Other than full-time permanent	0	365
11.5 Other personnel compensation	0	193
11.8 Special personnel services payments	0	5
11.9 Total personnel compensation	0	19,477
12 Civilian personnel benefits	0	5,956
13 Benefits for former personnel	0	1
21 Travel and transportation of persons	0	513
22 Transportation of things	0	161
23.1 Rental payments to GSA	0	1,692
23.2 Rental Payments to others	0	285
23.3 Communications, utilities and miscellaneous charges	0	1,063
24 Printing and reproduction	0	148
25.1 Advisory and assistance services	0	5,721
25.2 Other services	0	228
25.3 Purchases of goods & services from Gov't accounts	0	976
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	10
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	1,000
31 Equipment	0	210
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	(10,000)	14,472
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	(10,000)	51,913

<sup>32</sup> Due to financial system limitations, the object class detail for the Program reflects the Habitat Management and Restoration PPA.

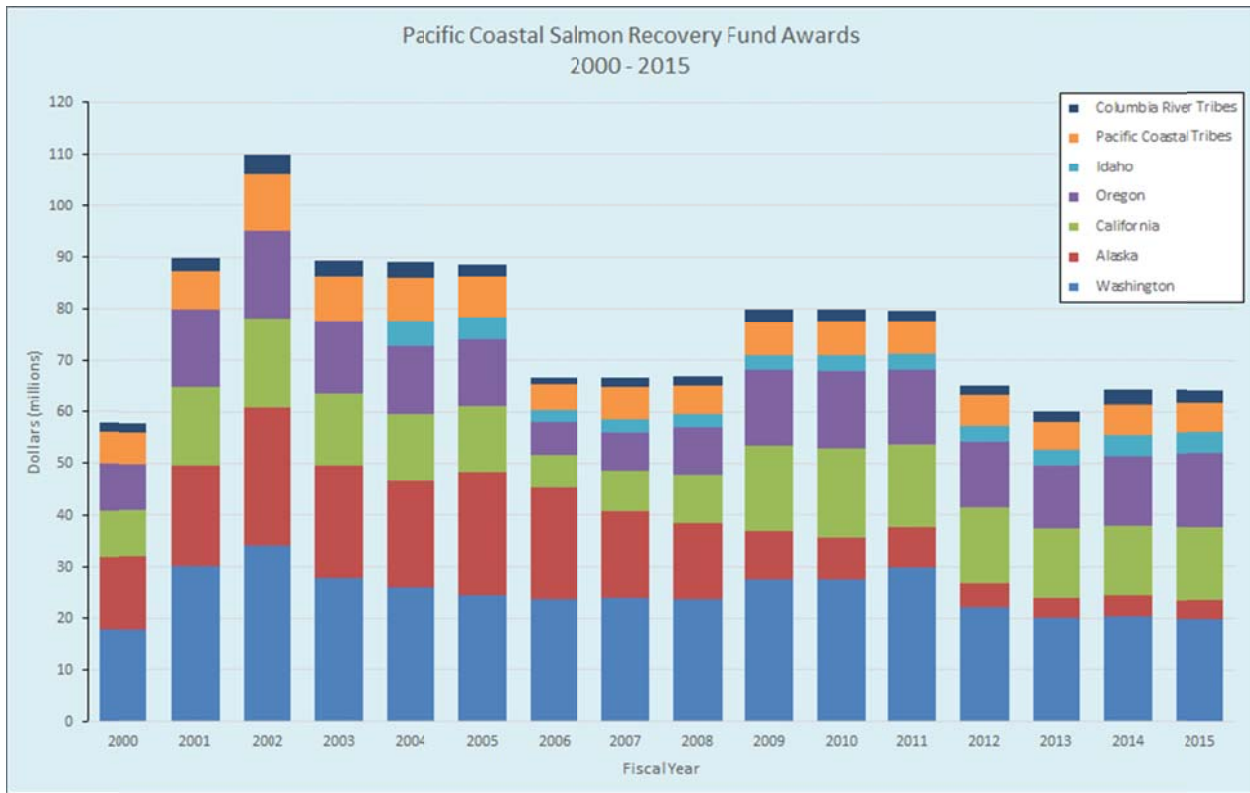
## **APPROPRIATION ACCOUNT: PACIFIC COASTAL SALMON RECOVERY FUND**

Land-use, harvest, hatchery practices, and changing ocean conditions have increased the vulnerability of Pacific salmonid populations, contributing to their decline and the listing of many populations as threatened or endangered under the Endangered Species Act (ESA). Over the course of their life cycle, salmonids require suitable habitat in mainstem rivers, tributaries, coastal estuaries, wetlands, and the Pacific Ocean. A number of environmental challenges affect the survival of salmonids, including variability in ocean conditions, destruction of nearshore and freshwater habitats, and other natural- and human- caused ecosystem changes.

The Pacific Coastal Salmon Recovery Fund (PCSRF) was established by Congress in FY 2000 to protect, restore, and conserve Pacific salmonids and their habitats. The Congressionally authorized activities that were funded under the PCSRF program included:

- 1) conserving salmon and steelhead populations that are listed as threatened or endangered, or identified by a state as at-risk to be so listed;
- 2) maintaining populations necessary for exercise of tribal treaty fishing rights or native subsistence fishing; and,
- 3) conserving Pacific coastal salmon and steelhead habitat.

The PCSRF program provides competitive funding to states and Tribes of the Pacific Coast region to implement projects that restore and protect salmonid populations and their habitats. Eligible applicants include the States of Washington, Oregon, California, Idaho, Nevada, and Alaska and Federally recognized Tribes of the Columbia River and Pacific Coast (including Alaska). States are required to provide 33 percent matching funds, and PCSRF awards are supplemented further by significant private and local contributions at the project level. No match is required from the Federally recognized Tribes. PCSRF has awarded over \$1.2 billion since 2000. With this funding, states and Tribes have leveraged additional resources to collectively implement 12,000 projects to conserve West Coast salmon.



Key accomplishments for PCSRF-funded activities from FY 2000 to 2015 include:

- More than 1,060,000 acres of habitat restored.
- Passage restored to over 9,100 stream miles of salmon habitat.

Since 2000, PCSRF has funded more than 12,000 projects along the Pacific Coast that contribute to preventing extinction and improving the status of ESA-listed species and their habitats, as well as supporting and protecting healthy populations. Projects range from single-site culvert replacement to hundreds of acres of habitat acquisition and restoration. Habitat restoration activities funded by PCSRF are an important component of overall salmonid recovery efforts in the Pacific Coast region. Restoration projects have increased the quality and quantity of spawning and rearing habitat from stream headwaters to coastal estuaries. Upstream restoration activities have controlled erosion, enhanced in-stream flow and streambed conditions, and provided the habitat necessary for successful spawning and egg survival. Estuary and wetland restoration projects closer to the coast have protected and improved feeding and rearing habitat used by juvenile fish as they transition from freshwater to the open ocean. PCSRF restoration projects have also removed more than 2,500 barriers to fish passage along streams, restoring access to high-quality habitat.

The PCSRF program ensures that funded projects are implementing the priority actions that address the identified factors limiting salmon and steelhead recovery, as specified in NOAA's ESA recovery plans. Riparian habitat restoration priorities are also coordinated among NOAA/PCSRF, EPA, and USDA/NRCS to maximize the collective benefits of the agencies' grant programs. PCSRF-funded activities also include robust planning and monitoring programs that inform strategic prioritization of projects and track salmon conservation accomplishments. As projects are completed, state and tribal grantees are required to collect

and report project-specific data to inform the PCSRF performance metrics.

PCSRF habitat projects provided a number of benefits to the human community, including enhanced water quality, recreation opportunities, flood control, and coastline protection. Recent studies suggest that a \$1.0 million investment in watershed restoration, of which PCSRF and state matching funds play a significant role, creates on average 16<sup>33</sup> to 17<sup>34</sup> new “green” jobs and averages \$2.3 million<sup>33</sup> in economic activity. Additionally, approximately 80 percent of habitat restoration investments are spent locally in the county in which the project is located, and over 90 percent is spent within the state<sup>35</sup>, supporting local jobs and local economies, often in rural and economically distressed communities.

Economic effects per \$1.0 million invested in forest and watershed restoration projects<sup>33, 34</sup>

Project Type	Definition	Jobs/\$1M	Economic Output/\$1M
In-stream	Enhancing stream habitat and function	14.7	\$2,203,851
Riparian	Restoring riparian habitat function, enhancing and restoring native riparian vegetation	19.0 - 23.1	\$2,310,128
Wetland	Restoring wetland and estuarine habitat	17.6	\$2,259,422
Reconnection	Restoring the flow of water to coastal systems and floodplains	14.6	
Fish Passage	Removing barriers to fish passage (culverts and dams), screening to protect fish from water withdrawals	15.2 - 18.2	\$2,240,281
Upland	Managing agricultural water, juniper, and noxious weeds	15.0	\$2,476,290
Others	Undertaking multiple activities in one comprehensive restoration project	14.7	\$2,270,862
<b>Average</b>		<b>16.3 – 17.0</b>	<b>\$2,311,468</b>

<sup>33</sup> Nielsen-Pincus, M., and C. Moseley. 2010. Economic and employment impacts of forest and watershed restoration in Oregon. University of Oregon, Institute for a Sustainable Environment, Ecosystem Workforce Program, Working Paper Number 24, Spring 2010.

<sup>34</sup> Edwards, P.E.T., A.E. Sutton-Grier and C.E. Coyle. 2013 Investing in nature: Restoring coastal habitat blue infrastructure and green job creation. *Marine Policy* 38:65-71.

<sup>35</sup> Hibbard, M. and S. Lurie. 2006. Some community socio-economic benefits of watershed councils: A case study from Oregon. *Journal of Environmental Planning and Management* 49:891-908.

Redwood Creek (CA) stream channel and off-channel pond restoration: Before (March 10, 2009).  
Credit: National Park Service.



Redwood Creek (CA) stream channel and off-channel pond restoration: After (November 14, 2011)  
Credit: National Park Service.



**Schedule and Milestones:**

FY 2017–2021:

- Issue a FY 2017 Federal Funding Opportunity through Grants.gov soliciting proposals for Pacific salmon recovery from states and Tribes in the Pacific Coast region
- Conduct 5 of outreach and coordination workshops with grantees regarding identified priority areas for habitat restoration and protection, as specified in NOAA’s salmonid recovery plans
- Continue encouraging grantees to include initiatives in their programs to

maximize partnerships and leveraged funds to implement large-scale restoration priorities

- Review Pacific salmon recovery proposals per the NOAA program priorities and evaluation criteria detailed in the Federal Funding Opportunity
- Competitively award Pacific salmon recovery grants to states and Tribes in the Pacific region to implement habitat restoration and recovery projects focused on improving the status of salmonid populations and their habitats
- Track progress, measure performance, and ensure accountability in the use of PCSRF funds

**Deliverables:**

FY 2017–2021:

- Enhanced availability of salmonid habitat
- Improved quality of salmon habitat
- Implementation of projects targeting the factors limiting the recovery of ESA-listed salmonids, with an emphasis on riparian habitat restoration and protection

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Number of habitat acres restored (annually) (Indicator 3.4f)	22,975	23,922	47,300	49,800	50,000	50,000	50,000
Habitat Program Acres	8,414	8,522	6,300	7,800	8,000	8,000	8,000
ARRA funded acres <sup>1</sup>	1,949	0	0	0	0	0	0
PCSRF acres <sup>2</sup>	12,688	15,400	41,000	42,000	42,000	42,000	42,000
Overlap <sup>3</sup>	76						

**Description:** NOAA restores habitat areas lost or degraded as a result of development and other human activities, as well as specific pollution incidents and sources. Activities are geared toward NOAA trust resources found across the marine environment, including the Great Lakes region, and are supportive of anadromous species (i.e., species that migrate between freshwater and the sea). The intent of this measure is to summarize or project the geographic area over which ecosystem function has been or will be improved as the direct result of habitat restoration efforts. This measure does not include restoration conducted the Species Recovery Grants. Examples of projects that contribute to this measure include hydrologic reconnection of wetlands, shellfish and coral reef restoration, and dam removal and fish passage.

1. Supported with FY 2009 American Recovery and Reinvestment Act (ARRA) funding.
2. PCSRF FY 2016 target represents the expected acres restored from funded projects with an anticipated completion date within the fiscal year. FY 2017–2021 targets are based on formula projections of acres restored based on program appropriations and past program performance.
3. Represents the overlap in habitat acres restored due to jointly funded PCSRF and NOAA Restoration Center projects. These “overlap” acres are include in the PCSRF and Habitat totals, respectively, but deducted from the total number of NOAA habitat acres restored.

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Number of stream miles made for ocean, coastal, and Great Lakes resources (annually)	910.5	710	600	610	610	610	610
Habitat Program stream miles	496	130	160	160	160	160	160
ARRA funded stream miles <sup>1</sup>	51	0	0	0	0	0	0
PCSRF stream miles <sup>2</sup>	363	580	440	450	450	450	450
Overlap <sup>3</sup>	0.5						
<p><b>Description:</b> This performance measure counts stream miles made accessible for diadromous species (i.e., species that migrate between freshwater and the sea) through restoration projects, fishway prescriptions, or consultations. Projects that contribute to this measure include removal of barriers or impediments such as dams, water control structures, culverts, and impoundments and fish passage projects that support recovery of listed species.</p> <p>1. Supported with FY 2009 Recovery and Reinvestment Act (ARRA) funds.</p> <p>2. PCSRF FY 2016 target represents the expected stream miles made accessible from funded projects with an anticipated completion date within the fiscal year. FY 2017–2021 targets are based on formula projections of stream miles based on program appropriations and past program performance.</p> <p>3. Represents the overlap in stream miles due to jointly funded PCSRF and NOAA Restoration Center projects. These “overlap” stream miles are included in the PCSRF and Habitat totals, respectively, but deducted from the total number of NOAA stream miles made accessible.</p>							



**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Pacific Coastal Salmon Recovery  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2016 Currently Available	2	2	65,000	65,001
less: Obligations from Prior Year Balances	0	0	0	(1)
plus: Other Adjustments-to-Base	0	0	0	0
FY 2017 Base	2	2	65,000	65,000
plus: 2017 Program Changes	0	0	0	0
FY 2017 Estimate	2	2	65,000	65,000

		FY 2015 Actuals Personnel Amount	FY 2016 Currently Available Personnel Amount	FY 2017 Base Program Personnel Amount	FY 2017 Estimate Personnel Amount	Increase/ (Decrease) Personnel Amount
Pacific Coastal Salmon Recovery Account	Pos/BA	2 64,935	2 65,001	2 65,000	2 65,000	0 0
	FTE/OBL	2 64,936	2 65,000	2 65,000	2 65,000	0 0
Total: Pacific Coastal Salmon Recovery Account	Pos/BA	2 64,935	2 65,001	2 65,000	2 65,000	0 0
	FTE/OBL	64,936	2 65,000	2 65,000	2 65,000	0 0

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Pacific Coastal Salmon Recovery  
**SUMMARY OF RESOURCE REQUIREMENTS**  
(Dollar amounts in thousands)

	FY 2015 Actuals		FY 2016 Currently Available		FY 2017 Base Program		FY 2017 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	2	64,936	2	65,001	2	65,000	2	65,000	0	0
<b>Total Obligations</b>	<b>2</b>	<b>64,936</b>	<b>2</b>	<b>65,001</b>	<b>2</b>	<b>65,000</b>	<b>2</b>	<b>65,000</b>	<b>0</b>	<b>0</b>
<b>Adjustments to Obligations:</b>										
Unobligated balance, expired	0	898	0	0	0	0	0	0	0	0
Recoveries	0	(250)	0	0	0	0	0	0	0	0
Unobligated balance, unapportioned	0	1	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	(650)	0	(1)	0	0	0	0	0	0
Unobligated balance, adj. EOY	0	0	0	0	0	0	0	0	0	0
<b>Total Budget Authority</b>	<b>2</b>	<b>64,935</b>	<b>2</b>	<b>65,000</b>	<b>2</b>	<b>65,000</b>	<b>2</b>	<b>65,000</b>	<b>0</b>	<b>0</b>
<b>Financing from Transfers and Other:</b>										
Transfer to ORF	0	65	0	0	0	0	0	0	0	0
<b>Net Appropriation</b>	<b>2</b>	<b>65,000</b>	<b>2</b>	<b>65,000</b>	<b>2</b>	<b>65,000</b>	<b>2</b>	<b>65,000</b>	<b>0</b>	<b>0</b>

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Pacific Coastal Salmon Recovery  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
(Dollar amounts in thousands)

<b>Object Class</b>	FY 2015 Actuals	FY 2016 Currently Available	FY 2017 Base	FY 2017 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	287	287	287	287	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	287	287	287	287	0
12.1 Civilian personnel benefits	96	96	96	96	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	0	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
Purchases of Goods/Services					
25.3 from Govt accounts	314	314	314	314	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	64,239	64,303	64,303	64,303	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 <b>Total Obligations</b>	64,936	65,000	65,000	65,000	0

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Pacific Coastal Salmon Recovery  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
(Dollar amounts in thousands)

Less prior year recoveries	(250)	0	0	0	0
Plus unobligated balance, unapportioned	1	0	0	0	0
Less unobligated balance, SOY	(650)	0	0	0	0
Plus unobligated balance, EOY	0	0	0	0	0
Unobligated Balance, expired	898	0	0	0	0
<b>Total Budget Authority</b>	<b>64,935</b>	<b>65,000</b>	<b>65,000</b>	<b>65,000</b>	<b>0</b>

**APPROPRIATION ACCOUNT: FISHERIES DISASTER ASSISTANCE FUND**

For FY 2017, NMFS requests a total of \$9,000,000 for the Fisheries Disaster Assistance Fund.

**JUSTIFICATION FOR FY 2017:**

The Consolidated Appropriations Act, 2014 (P.L. 113-76) provided funds for fisheries disaster assistance for specific disaster declarations in calendar years 2012 and 2013. The FY 2017 budget request includes a new proposal. Please see the program change below for details.

**PROPOSED LEGISLATION:**

*For necessary expenses associated with improving the environmental and economic resilience of fisheries designated a fishery disaster by the Secretary, \$9,000,000, to remain available until expended.*

**Fisheries Disaster Assistance Fund: Environmental and Economic Resilience (Base Funding: \$0 and 0 FTE; Program Change: \$9,000,000 and 0 FTE):** NOAA requests an increase of \$9,000,000 and 0 FTE for a total of \$9,000,000 and 0 FTE to support fisheries' environmental and economic resilience through a proactive program to address fisheries disasters.

Fisheries are subject to a number of factors that can cause sudden and unexpected losses, leading to serious economic impacts for fishermen and their communities. Events such as hurricanes and typhoons, changes in fresh water flows and droughts, changes in ocean temperatures, and harmful algal blooms can negatively impact fish stocks and/or damage fishing grounds, vessels, and fishing infrastructure. These impacts will likely be amplified into the future due to climate change.

This new program would make funding available for fisheries for which the Secretary has made a disaster determination under the MSA (sections 312(a) and 315) or IFA (sections 308(b) and (d)). By focusing on both environmental and economic resilience, this program will help the fishing industry and fishing communities recover from a disaster and reduce the need for disaster assistance in the future. The recovery phase represents an opportunity for fishing communities to adopt a resilience-centered approach that will support long-term improvements in the ecosystem and economy.

**Proposed Actions:**

The requested increase will allow NOAA to more quickly and effectively address the underlying economic and environmental causes of fisheries disasters. Currently, relief for declared fisheries disasters is not available until Congress appropriates funds, which can delay providing assistance to affected fisheries and communities. The proposed program would allow NMFS to establish a fund that will be used to provide relief in a more timely and effective manner. Each fishery disaster is unique, and the need for and best use of disaster relief must be determined on a case-by-case basis. NOAA will use the fund for activities that restore the fishery, increase environmental and economic resilience, and reduce the likelihood of future fishery disasters.

The types of activities that may be undertaken include, but are not limited to:

- Improved science and management strategies in support of sustainable fisheries, including science and research activities, improved data collection and monitoring, transition to more selective fishing gear, or other activities to improve the management of the fishery (e.g., transition to catch share management, establishment of cooperative management programs).
- Habitat restoration and protection, or other ecosystem resilience efforts that support healthy fish populations and provide ecosystem functions that reduce hazards and risks to coastal communities, including climate change.
- Job training and activities that help reduce fishing capacity and/or help transition fishermen to other industries or more sustainable fisheries, including aquaculture.
- Restoration and modernization of public, fishery-related infrastructure.

This fund is not intended to provide direct payments to fishermen to compensate for lost revenues. The objective is to support activities, such as those mentioned above, that help restore the fishery and provide long-term benefits in support of sustainable fisheries and resilient fishing communities, rather than short-term actions that fail to address the underlying challenges facing the fishery. Activities that meet those objectives may help fishermen and fishing communities financially weather periods of limited or no fishing as a result of a disaster.

**Statement of Need and Economic Benefits:**

Fisheries and the ecosystems that support them are an essential part of sustainable and resilient coastal communities and their economies. Fisheries provide jobs for fishermen, fish processors, and related support industries. Healthy ecosystems provide vital habitat for fish to reproduce and support a strong biological resource for sustainable fisheries. This fund will improve NMFS' responsiveness to fishery disasters and benefit the fishing industry through more timely relief and long-term improvements in fishery and ecosystem resilience.

Where a local economy is substantially dependent on fishing for a specific stock, a commercial fishery failure may have more severe impacts than in diversified economies, due to the lack of alternative fishing or non-fishing employment opportunities. Additionally, where failure is due to extreme weather or long-term changing environmental conditions improving coastal habitat to strengthen the resilience of coastal communities and fisheries may support the long-term sustainability of the fishery.

**Resource Assessment:**

Currently, there are no resources dedicated to fisheries disaster assistance. By providing more effective and timely relief focused on improving the environmental and economic resilience of fisheries and fishing communities, we expect to mitigate the negative impact of disasters more effectively. We will work with recipients to implement measures that improve the long-term sustainability of the fishery to reduce the likelihood of future disaster requests.

**Schedule and Milestones:**

FY 2017 – 2021:

- NOAA will develop and release procedures and criteria for merit-based distribution of funds

**Deliverables:**

- Procedures and criteria by which fund will be administered

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Program:** National Marine Fisheries Service  
**Sub-program:** Fisheries Disaster Assistance Fund  
**Program Change:** Economic and Ecosystem Resilience

Object Class	FY 2017 Increase	FY 2017 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$0
11.3 Other than full-time permanent	0	0
11.5 Other personnel compensation	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	0
12 Civilian personnel benefits	0	0
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	0
22 Transportation of things	0	0
23.1 Rental payments to GSA	0	0
23.2 Rental Payments to others	0	0
23.3 Communications, utilities and miscellaneous charges boats)	0	0
24 Printing and reproduction		0
25.1 Advisory and assistance services	0	0
25.2 Other services	0	0
25.3 Purchases of goods & services from Gov't accounts	0	0
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	0
31 Equipment	0	0
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	9,000	9,000
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	9,000	9,000



**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Fisheries Disaster Assistance Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2016 Currently Available	0	0	0	4,358
Adjustments to Base	0	0	0	0
less: Obligations from Prior Year Balances	0	0	0	(4,358)
FY 2017 Base	0	0	0	0
plus: 2017 Program Changes	0	0	9,000	9,000
FY 2017 Estimate	0	0	9,000	9,000

Comparison by activity/subactivity		FY 2015		FY 2016		FY 2017		FY 2017		Increase/ (Decrease)	
		Actuals Personnel Amount		Currently Available Personnel	Amount	Base Program Personnel Amount		Estimate Personnel Amount		Personnel Amount	
Fisheries Disaster Assistance Fund	Pos/BA	0	0	0	0	0	0	0	9,000	0	9,000
	FTE/OBL	0	44,830	0	4,358	0	0	0	9,000	0	9,000
Total: Fisheries Disaster Assistance Fund	Pos/BA	0	0	0	0	0	0	0	9,000	0	9,000
	FTE/OBL	0	44,830	0	4,358	0	0	0	9,000	0	9,000

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Fisheries Disaster Assistance Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	FY 2015 Actuals		FY 2016 Currently Available		FY 2017 Base Program		FY 2017 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	44,830	0	4,358	0	0	0	9,000	0	9,000
<b>Total Obligations</b>	<b>0</b>	<b>44,830</b>	<b>0</b>	<b>4,358</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9,000</b>	<b>0</b>	<b>9,000</b>
<b>Adjustments to Obligations:</b>										
Unobligated balance, adj. SOY	0	(49,188)	0	(4,358)	0	0	0	0	0	0
Unobligated balance, unavailable	0	0	0	0	0	0	0	0	0	0
Unobligated balance, EOY	0	4,358	0	0	0	0	0	0	0	0
<b>Total Budget Authority</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9,000</b>	<b>0</b>	<b>9,000</b>
<b>Financing from Transfers and Other:</b>										
Offsetting Collections from Non-Federal Sources	0	0	0	0	0	0	0	0	0	0
Transfer to ORF	0	0	0	0	0	0	0	0	0	0
<b>Net Appropriation</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9,000</b>	<b>0</b>	<b>9,000</b>

0

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Fisheries Disaster Assistance Fund  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
(Dollar amounts in thousands)

<b>Object Class</b>	FY 2015 Actuals	FY 2016 Currently Available	FY 2017 Base	FY 2017 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	0	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
25.2 Other services	0	0	0	0	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	44,830	4,358	0	9,000	9,000
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 <b>Total Obligations</b>	44,830	4,358	0	9,000	9,000

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Fisheries Disaster Assistance Fund  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
 (Dollar amounts in thousands)

Less prior year recoveries	0	0	0	0	0
Less unobligated balance, SOY	(49,188)	(4,358)	0	0	0
Plus unobligated balance, unavailable	0	0	0	0	0
Plus unobligated balance, EOY	4,358	0	0	0	0
<b>Total Budget Authority</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9,000</b>	<b>9,000</b>

## **APPROPRIATION ACCOUNT: FISHERMEN'S CONTINGENCY FUND**

For FY 2017, NMFS requests a total of \$350,000 for the Fishermen's Contingency Fund.

### **JUSTIFICATION FOR FY 2017:**

The Fishermen's Contingency Fund is authorized under Section 402 of Title IV of the Outer Continental Shelf Lands Act Amendments of 1978. NOAA compensates U.S. commercial fishermen for damage or loss of fishing gear, vessels, and resulting economic loss caused by obstructions related to oil and gas exploration, development, and production in any area of the Outer Continental Shelf. The funds used to provide this compensation are derived from fees collected on an annual basis by the Secretary of the Interior from the holders of leases, exploration permits, easements, or rights-of-way in areas of the Outer Continental Shelf.

This activity is funded totally through user fees. Disbursements can be made only to the extent authorized in appropriation acts.

### **PROPOSED LEGISLATION:**

*For carrying out the provisions of Title IV of Public Law 95-372, not to exceed \$350,000, to be derived from receipts collected pursuant to that Act, to remain available until expended.*

### **PROGRAM CHANGE FOR FY 2017:**

No program change is requested for this account.

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**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Fishermen's Contingency Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2016 Currently Available	0	0	350	350
plus: Obligations from prior year	0	0	0	0
plus: Other Adjustments-to-Base	0	0	0	0
FY 2017 Base	0	0	350	350
plus: 2017 Program Changes	0	0	0	0
FY 2017 Estimate	0	0	350	350

		FY 2015 Actuals Personnel Amount	FY 2016 Currently Available Personnel Amount	FY 2017 Base Program Personnel Amount	FY 2017 Estimate Personnel Amount	Increase/ (Decrease) Personnel Amount
Fishermen's Contingency Fund	Pos/BA	0	350	0	350	0
	FTE/OBL	0	72	0	350	0
Total: Fishermen's Contingency Fund	Pos/BA	0	350	0	350	0
	FTE/OBL	0	72	0	350	0

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Fishermen's Contingency Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
(Dollar amounts in thousands)

	FY 2015 Actuals		FY 2016 Currently Available		FY 2017 Base Program		FY 2017 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	72	0	350	0	350	0	350	0	0
<b>Total Obligations</b>	<b>0</b>	<b>72</b>	<b>0</b>	<b>350</b>	<b>0</b>	<b>350</b>	<b>0</b>	<b>350</b>	<b>0</b>	<b>0</b>
<b>Adjustments to Obligations:</b>										
Unobligated balance, adj. SOY	0	(482)	0	(760)	0	(760)	0	(760)	0	0
Unobligated balance, EOY	0	760	0	760	0	760	0	760	0	0
<b>Total Budget Authority</b>	<b>0</b>	<b>350</b>	<b>0</b>	<b>350</b>	<b>0</b>	<b>350</b>	<b>0</b>	<b>350</b>	<b>0</b>	<b>0</b>
<b>Financing from Transfers and Other:</b>										
Temporarily Reduced	0	0	0	0	0	0	0	0	0	0
Unapportioned	0	0	0	0	0	0	0	0	0	0
Discretionary Appropriation	0	0	0	0	0	0	0	0	0	0
<b>Net Appropriation</b>	<b>0</b>	<b>350</b>	<b>0</b>	<b>350</b>	<b>0</b>	<b>350</b>	<b>0</b>	<b>350</b>	<b>0</b>	<b>0</b>



**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Fishermen's Contingency Fund  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
(Dollar amounts in thousands)

<b>Object Class</b>	FY 2015 Actuals	FY 2016 Currently Available	FY 2017 Base	FY 2017 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	0	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
Other					
25.2 services	0	0	0	0	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	0	0	0	0	0
42 Insurance claims and indemnities	72	350	350	350	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 <b>Total Obligations</b>	72	350	350	350	0

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Fishermen's Contingency Fund  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
(Dollar amounts in thousands)

Less prior year recoveries	0	0	0	0	0
Less unobligated balance, SOY	(482)	(760)	(760)	(760)	0
Less unapportioned	0	0	0	0	0
Plus unobligated balance, EOY	760	760	760	760	0
Unobligated balance, rescission	0	0	0	0	0
<b>Total Budget Authority</b>	<u>350</u>	<u>350</u>	<u>350</u>	<u>350</u>	<u>0</u>

## **APPROPRIATION ACCOUNT: FOREIGN FISHING OBSERVER FUND**

For FY 2017, NMFS requests a total of \$0 for the Foreign Fishing Observer Fund.

### **JUSTIFICATION FOR FY 2017:**

The Foreign Fishing Observer Fund is financed through fees collected from owners and operators of foreign fishing vessels fishing within the U.S. EEZ (such fishing requires a permit issued under the MSA). This includes longline vessels fishing in the Atlantic billfish and shark fishery and other foreign vessels fishing in the EEZ. The fund is used by NOAA to pay salaries, administrative costs, data editing and entry costs, and other costs incurred in placing observers aboard foreign fishing vessels. The observer program is conducted primarily through contracts with the private sector. NOAA places these observers aboard foreign fishing vessels to monitor compliance with U.S. fishery laws and to collect fishery management data. Amounts available in the fund can be disbursed only to the extent and in amounts provided in appropriation acts. In FY 1985 Congress approved the establishment of a supplemental observer program. The program provided that foreign vessels without Federally funded observers are required to obtain the services of private contractors certified by the Secretary of Commerce.

### **PROGRAM CHANGE FOR FY 2017:**

No program change is requested for this account.

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**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Foreign Fishing Observer Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2016 Currently Available	0	0	0	0
less: Obligations from prior year	0	0	0	0
Plus: 2017 Adjustments to Base	0	0	0	0
FY 2017 Base	0	0	0	0
plus: 2017 Program Changes	0	0	0	0
FY 2017 Estimate	0	0	0	0

Comparison by activity/subactivity	FY 2015 Actuals Personnel Amount	FY 2016 Currently Available Personnel Amount	FY 2017 Base Program Personnel Amount	FY 2017 Estimate Personnel Amount	Increase/ (Decrease) Personnel Amount
Foreign Fishing Observer Fund	0	0	0	0	0
	0	0	0	0	0
Total: Foreign Fishing Observer Fund	0	0	0	0	0
	0	0	0	0	0

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Foreign Fishing Observer Fund  
**SUMMARY OF Financing**  
(Dollar amounts in thousands)

	FY 2015 Actuals		FY 2016 Currently Available		FY 2017 Base Program		FY 2017 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	0	0	0	0	0	0	0	0	0
<b>Total Obligations</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Adjustments to Obligations:</b>										
Unobligated balance, adj. SOY	0	(522)	0	(522)	0	(522)	0	(522)	0	0
Unobligated balance, EOY	0	522	0	522	0	522	0	522	0	0
<b>Total Budget Authority</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Financing from Transfers and Other:</b>										
Unobligated balance, rescission	0	0	0	0	0	0	0	0	0	0
<b>Net Appropriation</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Foreign Fishing Observer Fund  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
(Dollar amounts in thousands)

<b>Object Class</b>	FY 2015 Actuals	FY 2016 Currently Available	FY 2017 Base	FY 2017 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	0	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
25.2 Other services	0	0	0	0	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	0	0	0	0	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 <b>Total Obligations</b>	0	0	0	0	0

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Foreign Fishing Observer Fund  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
 (Dollar amounts in thousands)

Less prior year recoveries	0	0	0	0	0
Less unobligated balance, SOY	(522)	(522)	(522)	(522)	0
Plus unobligated balance, EOY	522	522	522	522	0
Unobligated balance, rescission	0	0	0	0	0
<b>Total Budget Authority</b>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>



## **APPROPRIATION ACCOUNT: FISHERIES FINANCE PROGRAM ACCOUNT**

For FY 2017, NMFS requests a total of \$0 for the Fisheries Finance Program Account.

### **JUSTIFICATION FOR FY 2017:**

The Fisheries Finance Program (FFP) is a national loan program that makes long-term fixed-rate financing available to U.S. citizens who otherwise qualify for financing or refinancing of the construction, reconstruction, reconditioning, and, in some cases, the purchasing of fishing vessels, shoreside processing, aquaculture, mariculture facilities, and the purchase of individual fishing quota (IFQ). The purpose of these loans is to provide stability to at least one aspect of an otherwise volatile industry. The FFP also provides fishery-wide financing to ease the transition to sustainable fisheries through its fishing capacity reduction programs and provides financial assistance in the form of loans to fishermen who fish from small vessels and entry-level fishermen to promote stability and reduce consolidation in already rationalized fisheries. Additionally, FFP can provide loans for fisheries investments of Native American Community Development Quota (CDQ) groups.

The FFP operates under the authority of Title XI of the Merchant Marine Act of 1936, as amended (46 USC 53701); Section 303(a) of the Sustainable Fisheries Act amendments to the MSA; and, from time to time FFP-specific legislation. FFP lending practices are guided by Title XI, general rules implementing Title XI (found at 50 CFR part 253, subpart B), NOAA's sustainable fisheries policy, and the practical considerations of a program that has continually not required an appropriation of loan loss subsidy under the Federal Credit Reform Act, as discussed below. The overriding guideline for all FFP financings is that they cannot contribute or be construed to contribute to an increase in existing fishing capacity.

All FFP authority is subject to the Federal Credit Reform Act of 1990 (FCRA) (2 U.S.C. 661), which requires the estimated loan losses (FCRA cost) be appropriated in cash at the time Congress authorizes annual credit ceilings. Some types of FFP loans require no FCRA subsidy appropriations because these types of loans have historically not required additional loan subsidy. However, specific loan ceilings for each type of loan authority must be included in appropriation language or other bill language regardless of the need for cash appropriations.

### **PROPOSED LEGISLATION:**

*Subject to section 502 of the Congressional Budget Act of 1974, during fiscal year 2017, obligations of direct loans may not exceed \$24,000,000 for Individual Fishing Quota loans and not to exceed \$100,000,000 for traditional direct loans as authorized by the Merchant Marine Act of 1936.*

### **PROGRAM CHANGE FOR FY 2017:**

No program change is requested for this account.

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**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Fisheries Finance Program Account  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2016 Currently Available	0	0	11,819	11,819
less: 2017 Adjustments to Base	0	0	0	0
less: Negative Subsidy Receipts Adjustment	0	0	(11,819)	(11,819)
FY 2017 Base	0	0	0	0
plus: 2017 Program Changes	0	0	0	0
FY 2017 Estimate	0	0	0	0

Comparison by activity/subactivity		FY 2015 Actuals		FY 2016 Currently Available		FY 2017 Base Program		FY 2017 Estimate		Increase/Decrease	
		Personnel Amount	Amount	Personnel Amount	Amount	Personnel Amount	Amount	Personnel Amount	Amount	Personnel Amount	Amount
Fisheries Finance Program Account	Pos/BA	0	22,757	0	11,819	0	0	0	0	0	0
	FTE/OBL	0	22,757	0	11,819	0	0	0	0	0	0
Total: Fisheries Finance Program Account	Pos/BA	0	22,757	0	11,819	0	0	0	0	0	0
	FTE/OBL	0	22,757	0	11,819	0	0	0	0	0	0

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Fisheries Finance Program Account  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	FY 2015 Actuals		FY 2016 Currently Available		FY 2017 Base Program		FY 2017 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Cost Loan Subsidy	0	0	0	0	0	0	0	0	0	
Credit Reestimates	0	22,757	0	11,819	0	0	0	0	0	0
<b>Total Obligations</b>	<b>0</b>	<b>22,757</b>	<b>0</b>	<b>11,819</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Adjustments to Obligations:</b>										
Unobligated balance, adj. SOY	0	(2,779)	0	(2,779)	0	(2,779)	0	(2,779)	0	0
Unobligated balance, EOY	0	2,779	0	2,779	0	2,779	0	2,779	0	0
<b>Total Budget Authority</b>	<b>0</b>	<b>22,757</b>	<b>0</b>	<b>11,819</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Financing from Transfers and Other:</b>										
Less: Permanent Indefinite Authority (Mandatory)	0	0	0	0	0	0	0	0	0	0
<b>Net Appropriation</b>	<b>0</b>	<b>22,757</b>	<b>0</b>	<b>11,819</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Fisheries Finance Program Account  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
(Dollar amounts in thousands)

<b>Object Class</b>	FY 2015 Actuals	FY 2016 Currently Available	FY 2017 Base	FY 2017 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	0	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
25.2 Other services	0	0	0	0	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions		0	0	0	0
42 Insurance claims and indemnities	22,757	11,819	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 <b>Total Obligations</b>	22,757	11,819	0	0	0

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Fisheries Finance Program Account  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
 (Dollar amounts in thousands)

Less prior year recoveries	0	0	0	0	0
Less unobligated balance, SOY	(2,779)	(2,779)	(2,779)	(2,779)	0
Plus unobligated balance, EOY	2,779	2,779	2,779	2,779	0
Unobligated balance, rescission	0	0	0	0	0
<b>Total Budget Authority</b>	<b>22,757</b>	<b>11,819</b>	<b>0</b>	<b>0</b>	<b>0</b>

**APPROPRIATION ACCOUNT: PROMOTE AND DEVELOP FISHERIES PRODUCTS**

For FY 2017, NMFS requests a total of \$15,646,770 for the Saltonstall-Kennedy Grant Program. NMFS estimates that a total of \$145,810,770 will be transferred from the Department of Agriculture to the Promote and Develop Account and that \$130,164,000 will be transferred from the Promote and Develop account to the Operations, Research, and Facilities (ORF) account.

**JUSTIFICATION FOR FY 2017:**

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 S-K funds. S-K 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, subject to appropriation, is available to carry out the purposes of the AFPA. The S-K grants program has provided substantial assistance to address impediments to the management, development, and utilization of the Nation's living marine resources. Each year a *Federal Register* notice is published announcing the program. NMFS receives input from the Regional Fishery Management Councils as well as its Regional Offices and Science Centers to develop these priority areas. The annual notice outlines priority areas, such as research on the reduction and/or elimination of bycatch, and aquaculture. The remainder of the Promote and Develop funds transferred is used to offset the appropriation requirements of the ORF account. In the President's Budget request, a transfer to ORF of \$130,164,000 will be allocated to the following activities at the specified level:

Fisheries Data Collections, Surveys, and Assessments	\$ 127,160,000
Interjurisdictional Fisheries Grants	<u>\$ 3,004,000</u>
Total	\$130,164,000

**PROGRAM CHANGE FOR FY 2017:**

No program change is requested for this account.

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**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Promote and Develop Fisheries Products  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2016 Currently Available	3	3	16,225	17,308
less: Obligations from prior year	0	0	(578)	(1,661)
plus: 2017 Adjustments to Base	0	0		0
<b>FY 2017 Base</b>	<b>3</b>	<b>3</b>	<b>15,647</b>	<b>15,647</b>
plus: 2017 Program Changes	0	0	0	0
<b>FY 2017 Estimate</b>	<b>3</b>	<b>3</b>	<b>15,647</b>	<b>15,647</b>

Comparison by activity/subactivity		FY 2015 Actuals		FY 2016 Currently Available		FY 2017 Base Program		FY 2017 Estimate		Increase/ (Decrease)	
		Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount		
Promote and Develop Fisheries Products	Pos/BA	3	26,616	3	16,225	3	15,647	3	15,647	0	0
	FTE/OBL	3	32,351	3	17,308	3	15,647	3	15,647	0	0
Total: Promote and Develop Fisheries Products	Pos/BA	3	26,616	3	16,225	3	15,647	3	15,647	0	0
	FTE/OBL	3	32,351	3	17,308	3	15,647	3	15,647	0	0

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Promote and Develop Fisheries Products  
**SUMMARY OF RESOURCE REQUIREMENTS**  
(Dollar amounts in thousands)

	FY 2015		FY 2016		FY 2017		FY 2017		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	3	32,351	0	17,308	0	15,647	0	15,647	0	0
<b>Total Obligations</b>	<b>3</b>	<b>32,351</b>	<b>0</b>	<b>17,308</b>	<b>0</b>	<b>15,647</b>	<b>0</b>	<b>15,647</b>	<b>0</b>	<b>0</b>
<b>Adjustments to Obligations:</b>										
Unobligated balance, adj. SOY	0	(6,817)	0	(1,083)	0	0	0	0	0	0
Recoveries	0	(1)	0	0	0	0	0	0	0	0
Unobligated balance, adj. EOY	0	1,083	0	0	0	0	0	0	0	0
<b>Total Budget Authority</b>	<b>3</b>	<b>26,616</b>	<b>0</b>	<b>16,225</b>	<b>0</b>	<b>15,647</b>	<b>0</b>	<b>15,647</b>	<b>0</b>	<b>0</b>
<b>Financing from Transfers and Other:</b>										
Transfer from USDA	(3)	(143,738)	0	(145,811)	0	(145,811)	0	(145,811)	0	0
Appropriations previously unavailable	0	(9,370)	0	(10,493)	0	(9,915)	0	(9,915)	0	0
Permanently Reduced	0	0	0	0	0	0	0	0	0	0
Temporarily Reduced	0	10,493	0	9,915	0	9,915	0	9,915	0	0
Transfer to ORF	0	116,000	0	130,164	0	130,164	0	130,164	0	0
<b>Net Appropriation</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Promote and Develop Fisheries Products  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
(Dollar amounts in thousands)

<b>Object Class</b>	FY 2015 Actuals	FY 2016 Currently Available	FY 2017 Base	FY 2017 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	362	362	362	362	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	362	362	362	362	0
12.1 Civilian personnel benefits	91	91	91	91	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	16	16	16	16	0
22 Transportation of things	1	1	1	1	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	5	5	5	5	0
25.2 Other services	3	3	3	3	0
Purchases of Goods/Services					
25.3 from Govt accounts	274	274	274	274	
26 Supplies and materials	33	33	33	33	0
31 Equipment	1	1	1	1	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	31,565	16,522	14,861	14,861	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 <b>Total Obligations</b>	32,351	17,308	15,647	15,647	0

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Promote and Develop Fisheries Products  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
 (Dollar amounts in thousands)

Less unobligated balance, SOY	(6,817)	(1,083)	0	0	0
Plus unobligated balance, EOY	1,083	0	0	0	0
Recoveries	(1)	0	0	0	0
<b>Total Budget Authority</b>	<b>26,616</b>	<b>16,225</b>	<b>15,647</b>	<b>15,647</b>	<b>0</b>

**APPROPRIATION ACCOUNT: FEDERAL SHIP FINANCING FUND**

For FY 2017, NMFS estimates a total of \$0 for the Federal Ship Financing Fund Account.

**JUSTIFICATION FOR FY 2017:**

The Federal Ship Financing Fund is the liquidating account necessary for the collection of premiums and fees of the loan guarantee portfolio that existed prior to FY 1992. Administrative expenses for management of the loan guarantee portfolio were charged to the Federal Ship Financing Fund prior to the enactment of the Federal Credit Reform Act of 1990. Administrative expenses are charged to the Operations, Research, and Facilities (ORF) account.

**PROGRAM CHANGE FOR FY 2017:**

No program change is requested for this account.

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**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Federal Ship Financing Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2016 Currently Available	0	0	0	0
FY 2017 Base	0	0	0	0
plus: 2017 Program Changes	0	0	0	0
FY 2017 Estimate	0	0	0	0

Comparison by activity/subactivity		FY 2015 Actuals Personnel Amount		FY 2016 Currently Available Personnel Amount		FY 2017 Base Program Personnel Amount		FY 2017 Estimate Personnel Amount		Increase/ (Decrease) Personnel Amount	
Federal Ship Financing Fund	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	29	0	0	0	0	0	0	0	0
Total: Federal Ship Financing Fund	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	29	0	0	0	0	0	0	0	0

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Federal Ship Financing Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	FY 2015 Actuals		FY 2016 Currently Available		FY 2017 Base Program		FY 2017 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Transfer to Treasury (Mandatory)	0	(113)	0	0	0	0	0	0	0	0
Offsetting collections, mandatory	0	142	0	0	0	0	0	0	0	0
<b>Total Obligations</b>	<b>0</b>	<b>29</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Adjustments to Obligations:</b>										
Offsetting Collections	0	(29)	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	0	0	0	0	0	0	0	0	0
Unobligated balance, adj. EOY	0	0	0	0	0	0	0	0	0	0
<b>Total Budget Authority</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>



**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Federal Ship Financing Fund  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
(Dollar amounts in thousands)

<b>Object Class</b>	FY 2015 Actuals	FY 2016 Currently Available	FY 2017 Base	FY 2017 Estimate	Increase/ (Decrease) over 2017 Base
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	0	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
25.2 Other services	0	0	0	0	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	29	0	0	0	0
41 Grants, subsidies and contributions	0	0	0	0	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 <b>Total Obligations</b>	29	0	0	0	0

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Federal Ship Financing Fund  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
 (Dollar amounts in thousands)

Less prior year recoveries	0	0	0	0	0
Less unobligated balance, SOY	0	0	0	0	0
Plus unobligated balance, transferred	113				
Plus unobligated balance, EOY	0	0	0	0	0
Offsetting Collections	(142)	0	0	0	0
<b>Total Budget Authority</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

**APPROPRIATION ACCOUNT: ENVIRONMENTAL IMPROVEMENT AND RESTORATION FUND**

For FY 2017, NMFS estimates obligating \$1,144,000 in the Environmental Improvement and Restoration Fund.

**JUSTIFICATION FOR FY 2017:**

The Environmental Improvement and Restoration Fund (EIRF) was created by the Department of Interior and Related Agencies Appropriations Act of 1998 for the purpose of carrying out marine research activities in the North Pacific. These funds will provide grants to Federal, state, private, or foreign organizations or individuals to conduct research activities on or relating to the fisheries or marine ecosystems in the North Pacific Ocean, Bering Sea, and Arctic Ocean.

**PROGRAM CHANGE FOR FY 2017:**

No program change is requested for this account.

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**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Environmental Improvement and Restoration Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2016 Currently Available	0	0	9,359	8,815
less: obligations from prior year balances	0	0	0	0
plus: 2017 Adjustments to Base	0	0	(5,187)	(7,671)
<b>FY 2017 Base</b>	<b>0</b>	<b>0</b>	<b>4,172</b>	<b>1,144</b>
plus: 2017 Program Changes	0	0	0	0
<b>FY 2017 Estimate</b>	<b>0</b>	<b>0</b>	<b>4,172</b>	<b>1,144</b>

Comparison by activity/subactivity		FY 2015 Actuals		FY 2016 Currently Available		FY 2017 Base Program		FY 2017 Estimate		Increase/ (Decrease)	
		Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount		
Environmental Improvement and Restoration Fund	Pos/BA	0	705	0	9,359	0	4,172	0	4,172	0	0
	FTE/OBL	0	8,988	0	8,815	0	1,144	0	1,144	0	0
Total: Environmental Improvement and Restoration Fund	Pos/BA	0	705	0	9,359	0	4,172	0	4,172	0	0
	FTE/OBL	0	8,988	0	8,815	0	1,144	0	1,144	0	0

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Environmental Improvement and Restoration Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
(Dollar amounts in thousands)

	FY 2015		FY 2016		FY 2017		FY 2017		Increase/	
	Actuals		Currently Available		Base Program		Estimate		(Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Mandatory Obligation	0	8,988	0	8,815	0	1,144	0	1,144	0	0
<b>Total Obligations</b>	<b>0</b>	<b>8,988</b>	<b>0</b>	<b>8,815</b>	<b>0</b>	<b>1,144</b>	<b>0</b>	<b>1,144</b>	<b>0</b>	<b>0</b>
<b>Adjustments to Obligations:</b>										
Unobligated balance, adj. SOY	0	(8,988)	0	(705)	0	(544)	0	(544)	0	0
Unobligated balance, unapportioned	0	705	0	0	0	0	0	0	0	0
Unobligated balance, transferred	0	0	0	705	0	0	0	0	0	0
Unobligated balance, EOY	0	0	0	544	0	3,572	0	3,572	0	0
<b>Total Budget Authority</b>	<b>0</b>	<b>705</b>	<b>0</b>	<b>9,359</b>	<b>0</b>	<b>4,172</b>	<b>0</b>	<b>4,172</b>	<b>0</b>	<b>0</b>
<b>Financing from Transfers and Other:</b>										
Appropriation previously unavailable	0	(705)	0	0	0	0	0	0	0	0
Permanently Reduced	0	0	0	683	0	304	0	304	0	0
<b>Net Mandatory Appropriation</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10,042</b>	<b>0</b>	<b>4,476</b>	<b>0</b>	<b>4,476</b>	<b>0</b>	<b>0</b>

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Environmental Improvement and Restoration Fund  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
(Dollar amounts in thousands)

<b>Object Class</b>	FY 2015 Actuals	FY 2016 Currently Available	FY 2017 Base	FY 2017 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	0	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
25.2 Other services	0	0	0	0	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	8,988	8,815	1,144	1,144	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 <b>Total Obligations</b>	8,988	8,815	1,144	1,144	0

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Environmental Improvement and Restoration Fund  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
 (Dollar amounts in thousands)

Less unobligated balance, SOY	(8,988)	(705)	(544)	(544)	0
Plus unobligated balance, unapportioned	705	0	0	0	0
Less unobligated balance, transferred	0	705	0	0	0
Plus unobligated balance, EOY	0	544	3,572	3,572	0
Unobligated balance, rescission	0	0	0	0	0
<b>Total Budget Authority</b>	<b>705</b>	<b>9,359</b>	<b>4,172</b>	<b>4,172</b>	<b>0</b>



## **APPROPRIATION ACCOUNT: LIMITED ACCESS SYSTEM ADMINISTRATION**

For FY 2017, NMFS estimates obligating \$12,742,000 in the Limited Access System Administration account.

### **JUSTIFICATION FOR FY 2017:**

Under the authority of MSA Section 304(d)(2)(A), NMFS must collect a fee to recover the incremental costs of management, data collection, and enforcement of Limited Access Privilege (LAP) programs. Funds collected under this authority are deposited into the "Limited Access System Administrative Fund" (LASAF). Fees cannot exceed three percent of the ex-vessel value of fish harvested under any such program, and shall be collected at either the time of the landing, filing of a landing report, or sale of such fish during a fishing season or in the last quarter of the calendar year in which the fish is harvested. The LASAF is available, without appropriation or fiscal year limitation, only for the purposes of administering the central registry system; and administering and implementing the MSA in the fishery in which the fees were collected. Sums in the fund that are not currently needed for these purposes are kept on deposit or invested in obligations of, or guaranteed by, the United States. Also, in establishing a LAP program, a Regional Council can consider, and may provide, if appropriate, an auction system or other program to collect royalties for the initial or any subsequent distribution of allocations. If an auction system is developed, revenues from these royalties are deposited in the Limited Access System Administration Fund.

### **PROGRAM CHANGE FOR FY 2017:**

No program change is requested for this account.

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**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Limited Access System Administration Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2016 Currently Available	38	38	12,507	12,636
Adjustments to Base	0	0	72	106
Less: Obligations from Prior Year Balances	0	0	0	0
FY 2017 Base	38	38	12,579	12,742
plus: 2017 Program Changes	0	0	0	0
FY 2017 Estimate	38	38	12,579	12,742

Comparison by activity/subactivity		FY 2015		FY 2016		FY 2017		FY 2017		Increase/ (Decrease)	
		Actuals		Currently Available		Base Program		Estimate		Personnel	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Limited Access System	Pos/BA	39	10,211	38	12,507	38	12,579	38	12,579	0	0
Administration Fund	FTE/OBL	39	11,222	38	12,636	38	12,742	38	12,742	0	0
Total: Limited Access System	Pos/BA	39	10,211	38	12,507	38	12,579	38	12,579	0	0
Administration Fund	FTE/OBL	39	11,222	38	12,636	38	12,742	38	12,742	0	0

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Limited Access System Administration Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
(Dollar amounts in thousands)

	FY 2015		FY 2016		FY 2017		FY 2017		Increase/ (Decrease)	
	Actuals		Currently Available		Base Program		Estimate			
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	39	11,222	38	12,636	38	12,742	38	12,742	0	0
<b>Total Obligations</b>	<b>39</b>	<b>11,222</b>	<b>38</b>	<b>12,636</b>	<b>38</b>	<b>12,742</b>	<b>38</b>	<b>12,742</b>	<b>0</b>	<b>0</b>
<b>Adjustments to Obligations:</b>										
Recoveries	0	(161)	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	(12,905)	0	(12,055)	0	(11,926)	0	(11,926)	0	0
Unobligated balance, transferred	0	0	0	0	0	0	0	0	0	0
Unobligated balance, EOY	0	12,055	0	11,926	0	11,763	0	11,763	0	0
<b>Total Budget Authority</b>	<b>39</b>	<b>10,211</b>	<b>38</b>	<b>12,507</b>	<b>38</b>	<b>12,579</b>	<b>38</b>	<b>12,579</b>	<b>0</b>	<b>0</b>
<b>Financing from Transfers and Other:</b>					0					
Appropriations previously unavailable	0	(712)	0	(865)	0	(850)	0	(850)	0	0
Temporarily Reduced	0	865	0	850	0	855	0	855	0	0
<b>Net Appropriation</b>	<b>39</b>	<b>10,364</b>	<b>38</b>	<b>12,492</b>	<b>38</b>	<b>12,584</b>	<b>38</b>	<b>12,584</b>	<b>0</b>	<b>0</b>

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Limited Access System Administration Fund  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
(Dollar amounts in thousands)

<b>Object Class</b>	FY 2015 Actuals	FY 2016 Currently Available	FY 2017 Base	FY 2017 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	3,507	3,507	3,507	3,507	0
11.3 Other than full-time permanent	380	380	380	380	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	3,887	3,887	3,887	3,887	0
12.1 Civilian personnel benefits	1,534	1,534	1,534	1,534	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	126	223	223	223	0
22 Transportation of things	5	10	10	10	0
23.1 Rental payments to GSA	386	433	433	433	0
23.2 Rental payments to others	7	8	8	8	0
23.3 Commun., util., misc. charges	58	65	65	65	0
24 Printing and reproduction	3	30	30	30	0
25.1 Advisory and assistance services	281	431	431	431	0
25.2 Other services	169	260	260	260	0
25.3 Purchases of goods/services from govt account	1,718	2,637	2,743	2,743	106
26 Supplies and materials	71	141	141	141	0
31 Equipment	90	90	90	90	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	2,887	2,887	2,887	2,887	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 <b>Total Obligations</b>	11,222	12,636	12,742	12,742	106

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Limited Access System Administration Fund  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
 (Dollar amounts in thousands)

Recoveries	(161)	0	0	0	0
Less unobligated balance, SOY	(12,905)	(12,055)	(11,926)	(11,926)	0
Unobligated balance, transferred	0	0	0	0	0
Plus unobligated balance, EOY	12,055	11,926	11,763	11,763	0
Unobligated balance, rescission	0	0	0	0	0
<b>Total Budget Authority</b>	<b>10,211</b>	<b>12,507</b>	<b>12,579</b>	<b>12,579</b>	<b>0</b>

## APPROPRIATION ACCOUNT: MARINE MAMMAL UNUSUAL MORTALITY EVENT FUND

For FY 2017, NMFS estimates obligating \$50,000 from the Marine Mammal Unusual Mortality Event Fund.

### JUSTIFICATION FOR FY 2017:

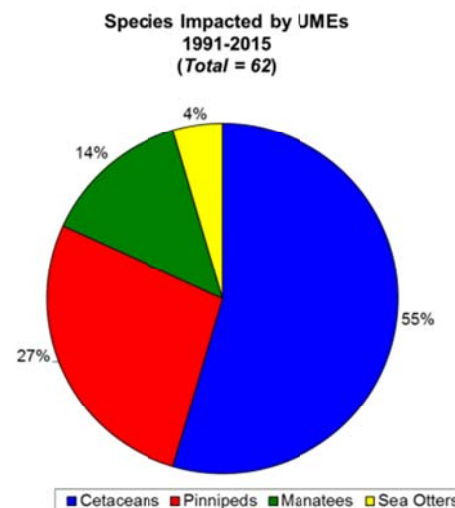
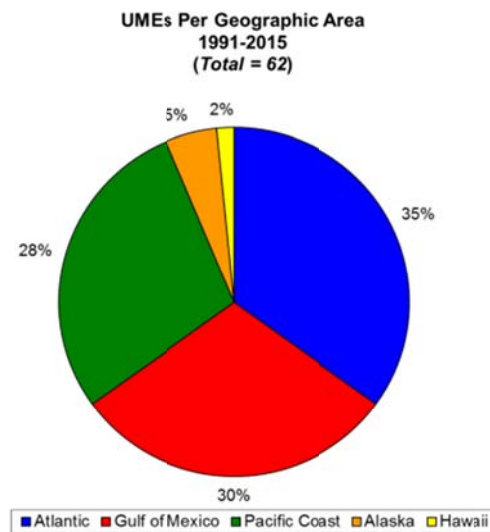
An unusual mortality event (UME) is defined under the Marine Mammal Protection Act (MMPA) as “a stranding that is unexpected; involves a significant die-off of any marine mammal population; and demands immediate response.” In recent years, increased efforts to examine carcasses and live stranded animals have improved the knowledge of mortality rates and causes, allowing a better understanding of population threats and stressors and the ability to determine when a situation is “unusual.” Understanding and investigating marine mammal UMEs is important because they can serve as indicators of ocean health, giving insight into larger environmental issues, which may also have implications for human health.

MMPA Section 405 (16 USC 1421d) establishes the Marine Mammal Unusual Mortality Event Fund and describes its purposes and how donations can be made to the Fund. The Fund is an emergency response fund used to help cover expenses incurred by the volunteer Marine Mammal Stranding Network during a UME. Specifically, the fund: “shall be available only for use by the Secretary of Commerce, in consultation with the Secretary of the Interior:

- to compensate persons for special costs incurred in acting in accordance with the contingency plan issued under section 1421c(b) of this title or under the direction of an Onsite Coordinator for an unusual mortality event;
- for reimbursing any stranding network participant for costs incurred in preparing and transporting tissues collected with respect to an unusual mortality event for the Tissue Bank; and,
- for care and maintenance of marine mammal seized under section 1374(c)(2)(D) of this title.”

According to the MMPA, deposits can be made into Fund in the following ways:

- “amounts appropriated to the Fund;
- other amounts appropriated to the Secretary for use with respect to unusual mortality events; and,



- amounts received by the United States in the form of gifts, devises, and bequests under subsection (d) of this section.”

Since UMEs are unpredictable emergency events caused by any number of circumstances (natural or human-caused), it is impossible to anticipate how many UMEs may occur in a given year or how much funding will be needed. During the past 24 years (1991– 2014), NOAA declared 60 UMEs, an average of 2.6 UMEs per year. The highest number of UMEs declared in a year was 5 (in both 2006 and 2007). The costs associated with UMEs are highly variable and depend on the species involved, location, and equipment/laboratory needs. For example, a UME involving large whales offshore can cost well over \$100,000 in expenses because of the considerable logistical challenges and needs (e.g., ship time or aerial support, number of personnel, safety equipment, etc.). Based on previous experience, NOAA expects to obligate \$50,000 in FY 2017 depending on the severity of the emergencies that year, donations received, and the balance of funds remaining.

To date, Congress has appropriated funding for UMEs on one occasion in 2005. In order to accept donations from the public, the UME Contingency Fund has been listed on pay.gov.

**PROGRAM CHANGE FOR FY 2017:**

No program change is requested for this account.



**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Marine Mammal Unusual Mortality Event Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2016 Currently Available	0	0	0	50
	0	0	0	0
Adjustments to Base FY 2017 Base	0	0	0	50
plus: 2017 Program Changes	0	0	0	0
FY 2017 Estimate	0	0	0	50

Comparison by activity/subactivity		FY 2015 Actuals Personnel Amount		FY 2016 Currently Available Personnel Amount		FY 2017 Base Program Personnel Amount		FY 2017 Estimate Personnel Amount		Increase/ (Decrease) Personnel Amount
Marine Mammal Unusual Mortality Event Fund	Pos/BA	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	50	0	50	0	50	0
Total: Marine Mammal Unusual Mortality Event Fund	Pos/BA	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	50	0	50	0	50	0

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Marine Mammal Unusual Mortality Event Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	FY 2015 Actuals		FY 2016 Currently Available		FY 2017 Base Program		FY 2017 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	0	0	50	0	50	0	50	0	0
<b>Total Obligations</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>50</b>	<b>0</b>	<b>50</b>	<b>0</b>	<b>50</b>	<b>0</b>	<b>0</b>
<b>Adjustments to Obligations:</b>										
Recoveries	0	(1)	0	0	0	0	0	0	0	0
Collections	0	0	0	(50)	0	(50)	0	(50)	0	
Unobligated balance, adj. SOY	0	(23)	0	(23)	0	(23)	0	(23)	0	0
Unobligated balance, unapportioned	0	1	0	0	0		0	0	0	0
Unobligated balance, EOY	0	23	0	23	0	23	0	23	0	0
<b>Total Budget Authority</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Financing from Transfers and Other:</b>										
Appropriation previously unavailable	0	0	0	0	0		0	0	0	0
<b>Net Appropriation</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

0

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Marine Mammal Unusual Mortality Event Fund  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
(Dollar amounts in thousands)

<b>Object Class</b>	FY 2015 Actuals	FY 2016 Currently Available	FY 2017 Base	FY 2017 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	0	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
25.2 Other services	0	0	0	0	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	0	50	50	50	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 <b>Total Obligations</b>	0	50	50	50	0

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Marine Mammal Unusual Mortality Event Fund  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
 (Dollar amounts in thousands)

Less prior year recoveries	(1)	0	0	0	0
Less unobligated balance, SOY	(23)	(23)	(23)	(23)	0
Plus unobligated balance, EOY	23	23	23	23	0
Unobligated balance, unapportioned	1	0	0	0	0
<b>Total Budget Authority</b>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>

## **APPROPRIATION ACCOUNT: WESTERN PACIFIC SUSTAINABLE FISHERIES FUND**

For FY 2017, NMFS estimates obligating \$400,000 in the Western Pacific Sustainable Fisheries Fund.

### **JUSTIFICATION FOR FY 2017:**

Section 204(e) of the 2006 amendments to the MSA authorizes the establishment of the Western Pacific Sustainable Fisheries Fund. The purpose of this Fund is to allow foreign fishing within the U.S. Exclusive Economic Zone (EEZ) in the Western Pacific through a Pacific Insular Area Fishery Agreement. Before entering into such an Agreement, the Western Pacific Fishery Management Council must develop a Marine Conservation Plan that provides details on uses for any funds collected by the Secretary of Commerce. Marine Conservation Plans must also be developed by the Governors of the Territories of Guam and American Samoa and of the Commonwealth of the Northern Mariana Islands and approved by the Secretary or designee.

The Western Pacific Sustainable Fisheries Fund serves as a repository for any permit payments received by the Secretary for foreign fishing within the U.S. EEZ around Johnston Atoll, Kingman Reef, Palmyra Atoll, and Jarvis, Howland, Baker and Wake Islands, sometimes known as the Pacific remote island areas (PRIA). Funds are available to:

- The Western Pacific Council for the purpose of carrying out implementation of a marine conservation plan (see below for more info on marine conservation plans)
- The Secretary of State for mutually agreed upon travel expenses for no more than 2 Federal representatives incurred as a direct result of negotiations and entering into a Pacific Insular Area fishery agreement. These fishery agreements authorize foreign fishing within the exclusive economic zone adjacent to a Pacific Insular Area other than American Samoa, Guam, or the Northern Mariana Islands, at the request of the Western Pacific Council)
- The Western Pacific Council to meet conservation and management objectives in the State of Hawaii if monies remain in the Western Pacific Sustainable Fisheries Fund after the funding requirements of subparagraphs (A) and (B) have been satisfied.

In the case of violations by foreign vessels occurring in these areas, amounts received by the Secretary attributable to fines and penalties are deposited into the Western Pacific Sustainable Fisheries Fund to be used for fisheries enforcement and for implementation of a marine conservation plan. Additionally, any funds or contributions received in support of conservation and management objectives under a Marine Conservation Plan for any Pacific Insular Area other than American Samoa, Guam, or the Northern Mariana Islands are deposited in the Western Pacific Sustainable Fisheries Fund.

### **PROGRAM CHANGE FOR FY 2017:**

No program change is requested for this account.

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**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Western Pacific Sustainable Fisheries Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2016 Currently Available	0	0	391	481
	0	0	9	(81)
<b>FY 2017 Base</b>	<b>0</b>	<b>0</b>	<b>400</b>	<b>400</b>
plus: 2017 Program Changes	0	0	0	0
<b>FY 2017 Estimate</b>	<b>0</b>	<b>0</b>	<b>400</b>	<b>400</b>

Comparison by activity/subactivity		FY 2015 Actuals		FY 2016 Currently Available Personnel Amount		FY 2017 Base Program Personnel Amount		FY 2017 Estimate Personnel Amount		Increase/ (Decrease) Personnel Amount	
		Personnel	Amou	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Western Pacific Sustainable Fisheries Fund	Pos/BA	0	247	0	391	0	400	0	400	0	0
	FTE/OBL	0	157	0	481	0	400	0	400	0	0
Total: Western Pacific Sustainable Fisheries Fund	Pos/BA	0	247	0	391	0	400	0	400	0	0
	FTE/OBL	0		0	481	0	400	0	400	0	0

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Western Pacific Sustainable Fisheries Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
(Dollar amounts in thousands)

	FY 2015 Actuals		FY 2016 Currently Available		FY 2017 Base Program		FY 2017 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	157	0	481	0	400	0	400	0	0
<b>Total Obligations</b>	<b>0</b>	<b>157</b>	<b>0</b>	<b>481</b>	<b>0</b>	<b>400</b>	<b>0</b>	<b>400</b>	<b>0</b>	<b>0</b>
<b>Adjustments to Obligations:</b>										
Recoveries		0	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	0	0	(90)	0	0	0	0	0	0
Unobligated balance, unapportioned	0	90								
Unobligated balance, EOY	0	0	0	0	0	0	0	0	0	0
<b>Total Budget Authority</b>	<b>0</b>	<b>247</b>	<b>0</b>	<b>391</b>	<b>0</b>	<b>400</b>	<b>0</b>	<b>400</b>	<b>0</b>	<b>0</b>
<b>Financing from Transfers and Other:<sup>0</sup></b>										
Appropriation previously unavailable	0	(90)	0	(18)	0	(27)	0	(27)	0	0
Temporarily Reduced	0	18	0	27	0	27	0	27	0	0
<b>Net Appropriation</b>	<b>0</b>	<b>175</b>	<b>0</b>	<b>400</b>	<b>0</b>	<b>400</b>	<b>0</b>	<b>400</b>	<b>0</b>	<b>0</b>



**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Western Pacific Sustainable Fisheries Fund  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
(Dollar amounts in thousands)

<b>Object Class</b>	FY 2015 Actuals	FY 2016 Currently Available	FY 2017 Base	FY 2017 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	0	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
25.2 Other services	0	0	0	0	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	157	481	400	400	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 <b>Total Obligations</b>	157	481	400	400	0

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Western Pacific Sustainable Fisheries Fund  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
 (Dollar amounts in thousands)

Recoveries	0	0	0	0	0
Less unobligated balance, SOY	0	(90)	0	0	0
Plus unobligated balance, EOY	0	0	0	0	0
Unobligated balance, unapportioned	90	0	0	0	0
<b>Total Budget Authority</b>	<b>247</b>	<b>391</b>	<b>400</b>	<b>400</b>	<b>0</b>

## **APPROPRIATION ACCOUNT: FISHERIES ASSET FORFEITURE FUND**

For FY 2017, NMFS estimates it will collect \$4,000,000 in fines, penalties, and forfeitures proceeds. NOAA will obligate this amount to support the activities described below.

### **JUSTIFICATION FOR FY 2017:**

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. Pursuant to this authority, NOAA has established a Civil Monetary Penalty/Asset Forfeiture Fund (AFF) where these proceeds are deposited. When Congress established the AFF it was deemed appropriate to use these proceeds to offset in part the costs of administering the Enforcement program. Expenses funded through this source include: costs directly related to the storage, maintenance, and care of seized fish, vessels, or other property during a civil or criminal proceeding; expenditures related directly to specific investigations and enforcement proceedings such as travel for interviewing witnesses; enforcement-unique information technology infrastructure; and annual interagency agreement and contract costs for the administrative adjudication process, including Administrative Law Judges hired by the U.S. Coast Guard.

### **PROGRAM CHANGE FOR FY 2017:**

No program change is requested for this account.

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**Department of Commerce**  
**National Oceanic and Atmospheric Administration**  
**Fisheries Asset Forfeiture Fund**  
**SUMMARY OF RESOURCE REQUIREMENTS**  
(Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2016 Currently Available	0	0	4,020	2,870
Adjustments to Base	0	0	(20)	23
Less: Obligations from Prior Year Balances	0	0	0	0
FY 2017 Base	0	0	4,000	2,893
plus: 2017 Program Changes	0	0	0	0
FY 2017 Estimate	0	0	4,000	2,893

Comparison by activity/subactivity		FY 2015 Actuals Personnel Amount	FY 2016 Currently Available Personnel Amount	FY 2017 Base Program Personnel Amount	FY 2017 Estimate Personnel Amount	Increase/ (Decrease) Personnel Amount
Fisheries Asset Forfeiture Fund	Pos/BA	0 4,220	0 4,020	0 4,000	0 4,000	0 0
	FTE/OBL	0 949	0 2,870	0 2,893	0 2,893	0 0
Total: Fisheries Asset Forfeiture Fund	Pos/BA	0 4,220	0 4,020	0 4,000	0 4,000	0 0
	FTE/OBL	0 949	0 2,870	0 2,893	0 2,893	0 0

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
**Fisheries Asset Forfeiture Fund**  
**SUMMARY OF RESOURCE REQUIREMENTS**  
(Dollar amounts in thousands)

	FY 2015 Actuals		FY 2016 Currently Available		FY 2017 Base Program		FY 2017 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Mandatory Obligation	0	949	0	2,870	0	2,893	0	2,893	0	0
<b>Total Obligations</b>	<b>0</b>	<b>949</b>	<b>0</b>	<b>2,870</b>	<b>0</b>	<b>2,893</b>	<b>0</b>	<b>2,893</b>	<b>0</b>	<b>0</b>
<b>Adjustments to Obligations:</b>										
Offsetting collections	0	0	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	(11,122)	0	(14,393)	0	(15,543)	0	(15,543)	0	0
Unobligated balance, unapportioned	0	333	0	0	0	0	0	0	0	0
Unobligated balance, EOY	0	14,060	0	15,543	0	16,650	0	16,650	0	0
<b>Total Budget Authority</b>	<b>0</b>	<b>4,220</b>	<b>0</b>	<b>4,020</b>	<b>0</b>	<b>4,000</b>	<b>0</b>	<b>4,000</b>	<b>0</b>	<b>0</b>
<b>Financing from Transfers and Other:</b>										
Mandatory Appropriation										
Temporarily Reduced	0	291	0	272	0	272	0	272	0	0
Appropriations previously unavailable	0	(179)	0	(292)	0	(272)	0	(272)	0	0
<b>Net Appropriation</b>	<b>0</b>	<b>4,332</b>	<b>0</b>	<b>4,000</b>	<b>0</b>	<b>4,000</b>	<b>0</b>	<b>4,000</b>	<b>0</b>	<b>0</b>

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
**Fisheries Asset Forfeiture Fund**  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
(Dollar amounts in thousands)

<b>Object Class</b>	FY 2015 Actuals	FY 2016 Currently Available	FY 2017 Base	FY 2017 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	527	527	527	527	0
22 Transportation of things	1	1	1	1	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	2	19	19	19	0
23.3 Commun., util., misc. charges	1	6	6	6	0
24 Printing and reproduction	1	1	1	1	0
25.1 Advisory and assistance services	25	1,454	1,477	1,477	
25.2 Other services	8	465	465	465	0
26 Supplies and materials	20	20	20	20	0
31 Equipment	114	127	127	127	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	250	250	250	250	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
<b>99 Total Obligations</b>	<b>949</b>	<b>2,870</b>	<b>2,893</b>	<b>2,893</b>	<b>0</b>

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
**Fisheries Asset Forfeiture Fund**  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
 (Dollar amounts in thousands)

Offsetting collections	0	0	0	0	0
Less unobligated balance, SOY	(11,122)	(14,393)	(15,543)	(15,543)	0
Plus unobligated balance, EOY	14,060	15,543	16,650	16,650	0
Unobligated balance, unapportioned	333	0	0	0	0
<b>Total Budget Authority</b>	<b>4,220</b>	<b>4,020</b>	<b>4,000</b>	<b>4,000</b>	<b>0</b>



## **APPROPRIATION ACCOUNT: NORTH PACIFIC OBSERVER FUND**

For FY 2017, NMFS estimates obligating \$3,970,000 for the North Pacific Observer Fund.

### **JUSTIFICATION FOR FY 2017:**

On January 1, 2013, the restructured North Pacific Groundfish Observer Program (NPGOP) went into effect and made important changes to how observers are deployed, how observer coverage is funded, and the vessels and processors that must have some or all of their operations observed. Coverage levels are no longer based on vessel length and processing volume; rather, NMFS now has the flexibility to decide when and where to deploy observers based on a scientifically defensible deployment plan. The new observer program places all vessels and processors in the groundfish and halibut fisheries off Alaska into one of two observer coverage categories: (1) full coverage category and (2) partial coverage.

Vessels and processors in the full coverage category ( $\geq 100\%$  observer coverage) will obtain observers by contracting directly with observer providers. Vessels and processors in the full observer coverage category are required to have at least one observer at all times. This will represent no change from the status quo for participants in the full coverage category.

Vessels and processors in the partial coverage category ( $< 100\%$  observer coverage) will no longer contract independently with an observer provider, and will be required to carry an observer when they are selected through the Observer Declare and Deploy System (ODDS). Additionally, landings from all vessels in the partial coverage category will be assessed a 1.25 percent fee on standard ex-vessel prices of the landed catch weight of groundfish and halibut. The fee percentage is set in regulation and will be reviewed periodically by the North Pacific Council after the second year of the program. The money generated by this fee will be used to pay for observer coverage on the vessels and processors in the partial coverage category in the following year.

NMFS expects approximately \$3.4 million to be collected in fees from the FY 2016 season, to be used in FY 2017 for observer coverage.

### **PROGRAM CHANGE FOR FY 2017:**

No program change is requested for this account.

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**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
**North Pacific Observer Fund**  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2016 Currently Available	0	0	4,050	5,305
Adjustments to Base	0	0	(80)	(1,335)
Less: Obligations from Prior Year Balances	0	0	0	0
FY 2017 Base	0	0	3,970	3,970
plus: 2017 Program Changes	0	0	0	0
FY 2017 Estimate	0	0	3,970	3,970

Comparison by activity/subactivity		FY 2015 Actuals		FY 2016 Currently Available		FY 2017 Base Program		FY 2017 Estimate		Increase/ (Decrease)	
		Personnel Amount		Personnel Amount		Personnel Amount		Personnel Amount		Personnel Amount	
North Pacific Observer Fund	Pos/BA	0	3,412	0		0	3,970	0	3,970	0	0
	FTE/OBL		3,058	0	5,305 4,050	0	3,970	0	3,970	0	0
Total: North Pacific Observer Fund	Pos/BA	0	3,412	0	4,050	0	3,970	0	3,970	0	0
	FTE/OBL	0	3,058	0	5,305	0	3,970	0	3,970	0	0

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
North Pacific Observer Fund  
**SUMMARY OF RESOURCE REQUIREMENTS**  
(Dollar amounts in thousands)

	FY 2015		FY 2016		FY 2017		FY 2017		Increase/ (Decrease)	
	Actuals		Currently Available		Base Program		Estimate			
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Mandatory Obligation	0	3,058	0	5,305	0	3,970	0	3,970	0	0
<b>Total Obligations</b>	<b>0</b>	<b>3,058</b>	<b>0</b>	<b>5,305</b>	<b>0</b>	<b>3,970</b>	<b>0</b>	<b>3,970</b>	<b>0</b>	<b>0</b>
<b>Adjustments to Obligations:</b>										
Unobligated balance, adj. SOY	0	(901)	0	(1,255)	0	0	0	0	0	0
Unobligated balance, SOY	0	0	0	0	0	0	0	0	0	0
Unobligated balance, EOY	0	1,255	0	0	0	0	0	0	0	0
<b>Total Budget Authority</b>	<b>0</b>	<b>3,412</b>	<b>0</b>	<b>4,050</b>	<b>0</b>	<b>3,970</b>	<b>0</b>	<b>3,970</b>	<b>0</b>	<b>0</b>
<b>Financing from Transfers and Other:</b>										
Appropriation previously unavailable	0	(306)	0	(350)	0	(270)	0	(270)	0	0
Temporarily Reduced	0	350	0	270	0	270	0	270	0	0
<b>Net Appropriation</b>	<b>0</b>	<b>3,456</b>	<b>0</b>	<b>3,970</b>	<b>0</b>	<b>3,970</b>	<b>0</b>	<b>3,970</b>	<b>0</b>	<b>0</b>

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
North Pacific Observer Fund  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
(Dollar amounts in thousands)

<b>Object Class</b>	FY 2015 Actuals	FY 2016 Currently Available	FY 2017 Base	FY 2017 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	0	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
Purchases of goods/services from govt					
25.3 accounts	3,058	5,305	3,970	3,970	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	0	0	0	0	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 <b>Total Obligations</b>	3,058	5,305	3,970	3,970	0

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 North Pacific Observer Fund  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
 (Dollar amounts in thousands)

Less unobligated balance, SOY	(901)	(1,255)	0	0	0
Plus unobligated balance, EOY	1,255	0	0	0	0
Unobligated balance, rescission	0	0	0	0	0
<b>Total Budget Authority</b>	3,412	4,050	3,970	3,970	0

## **BUDGET PROGRAM: OCEANIC AND ATMOSPHERIC RESEARCH**

For FY 2017, NOAA requests a total of \$519,789,000 and 744 FTE for the Office of Oceanic and Atmospheric Research, including a net increase of \$30,758,000, and 9 FTE in program changes.

### **Office of Oceanic and Atmospheric Research Overview**

The Office of Oceanic and Atmospheric Research (OAR) is NOAA's central research Line Office charged with improving the understanding of changes in the Earth's environment. OAR integrates and conducts research across NOAA to advance NOAA's mission by providing better forecasts and improving understanding of the Earth and its processes. OAR conducts research on ocean acidification, aquaculture, severe weather, climate change, and deep sea environments and develops technology such as observing systems, unmanned aircraft systems, and autonomous underwater vehicles.

OAR is organized into four Operations, Research, and Facilities (ORF) sub-programs totaling \$468,952,000 and 735 FTE.

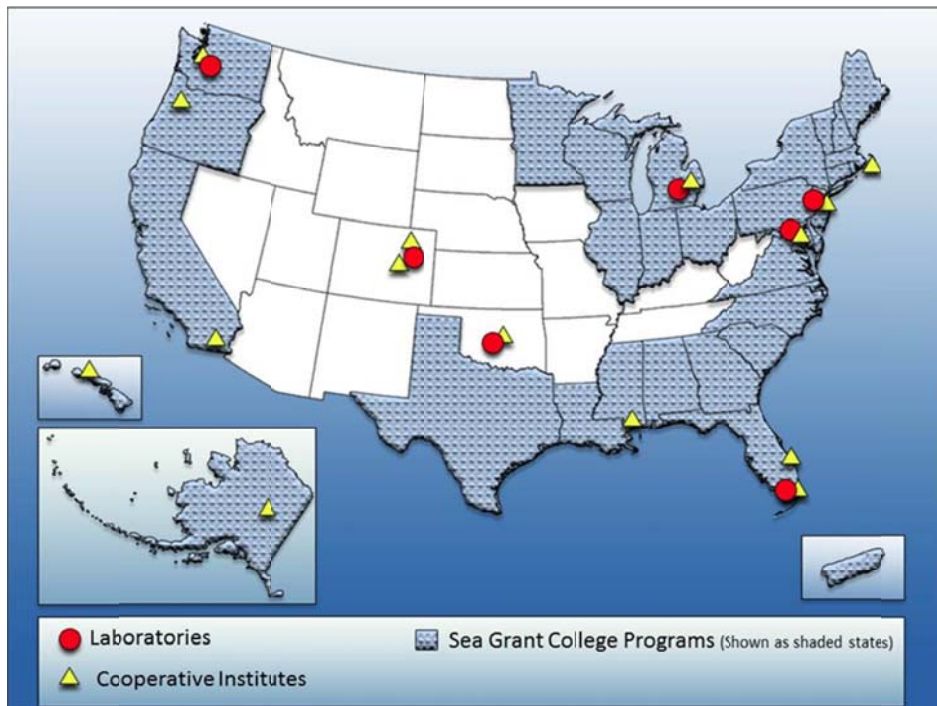
- **Climate Research** (\$159,106,000 and 272 FTE) includes Laboratories and Cooperative Institutes and research focused on gaining greater understanding of, and enhancing communities' ability to prepare for, climate variability and change.
- **Weather and Air Chemistry Research** (\$107,763,000 and 223 FTE) includes Laboratories and Cooperative Institutes as well as research focused on improving our understanding and forecasting capabilities for atmospheric events like severe storms and weather events that endanger lives and property.
- **Ocean, Coastal, and Great Lakes Research** (\$189,939,000 and 230 FTE) includes Laboratories and Cooperative Institutes, research, and grant programs focused on improving understanding of habitats, processes, and resources in the oceanic, coastal, and Great Lakes environments.
- **Innovative Research and Technology** (\$12,144,000 and 10 FTE) includes high performance computing initiatives, which advance computing, communications, and information technologies throughout NOAA.

OAR is organized into one Procurement, Acquisition, and Construction (PAC) sub-program totaling \$20,079,000 and 0 FTE.

- **System Acquisition**, which includes NOAA's investments in infrastructure for Research High Performance Computing. OAR manages a high performance computing system, which provides a platform to characterize and quantify weather and climate variations and change at a range of temporal and spatial scales.

### **OAR's Organizational Components:**

OAR operates through a national network of laboratories and other university-based research programs and manages its budget through the following eight organizational components: Laboratories and Cooperative Institutes, Climate Program Office, Office of Weather and Air Quality (OWAQ), National Sea Grant College Program, Office of Ocean Exploration and Research (OER), NOAA Integrated Ocean Acidification Program (OAP), Unmanned Aircraft Systems (UAS) Program, and the NOAA High-Performance Computing (HPC) Program.



*OAR Laboratories and Cooperative Institutes*

OAR has seven laboratories across the United States that conduct innovative research and development to improve understanding and predictions of changes in climate, weather, oceans, and coasts. This research is the foundation for NOAA products and services that support decision making by policymakers and the public. These laboratories collaborate with numerous external partners, including NOAA-funded Cooperative Institutes at academic and scientific institutions. OAR’s labs include: Atlantic Oceanographic and Meteorology Laboratory (AOML), Air Resources Laboratory (ARL), Earth System Research Laboratory (ESRL), Geophysical Fluid Dynamics Laboratory (GFDL), Great Lakes Environmental Research Laboratory (GLERL), National Severe Storms Laboratory (NSSL), and Pacific Marine Environmental Laboratory (PMEL).

OAR Cooperative Institutes foster long-term collaborations with academic and scientific institutions dedicated to advancing oceanic and atmospheric research. These Cooperative Institutes are co-located with one or more NOAA facilities to promote scientific exchange and technology transfer. Each institute brings together the resources of a research-oriented university or institution, OAR, and other branches of NOAA to develop and maintain specialized centers of excellence in research. OAR currently has 16 Cooperative Institute partnerships.

*Climate Program Office (CPO)*

CPO manages the competitive research program through which NOAA funds high-priority climate science and assessments to advance understanding of the Earth’s climate system. CPO science increases understanding of how climate variability and change affect public safety and the economy. CPO supports research nationally and globally.

*Office of Weather & Air Quality (OWAQ)*

OWAQ funds research to improve observations, analyses, and modeling capabilities to improve the accuracy and timeliness of warnings and forecasts for high-impact weather and air quality



issues that impact human health. This research includes social and behavioral science to ensure that NOAA's weather products provide sufficient information to protect life and property during high-impact weather events. OWAQ manages the U.S. Weather Research Program and hosts the multi-agency National Earth System Predictive Capability project.

#### *National Sea Grant College Program*

Congress established the National Sea Grant College Program in 1966 to enhance the development, use, and conservation of the Nation's coastal, marine, and Great Lakes resources. Currently, 33 Sea Grant programs are located in every U.S. coastal and Great Lakes state, Lake Champlain, Puerto Rico, and Guam. These programs focus on four critical areas: Resilient Communities and Economies, Sustainable Fisheries and Aquaculture, Healthy Coastal Ecosystems, and Environmental Literacy and Workforce Development.

#### *Office of Ocean Exploration and Research (OER)*

Most of the ocean remains unexplored, yet management decisions often rely on a complete picture of our oceans. OER explores the ocean to enhance research, policy and management decisions; develop new lines of scientific inquiry; and advise NOAA and the Nation on critical issues. OER conducts baseline characterizations of unknown or poorly-known ocean areas via the Okeanos Explorer, a NOAA ship dedicated to ocean exploration missions.

#### *NOAA Integrated Ocean Acidification Program (OAP)*

The OAP maintains long-term ocean acidification (OA) monitoring and data; conducts research on marine ecosystems sensitive to OA; promotes OA educational opportunities; and coordinates OA activities nationally and internationally.

#### *NOAA High Performance Computing (HPC) Program*

The HPC Program modernizes NOAA computing systems to improve weather, climate, and other environmental models and forecasts.

#### *Unmanned Aircraft Systems (UAS) Program*

The UAS program will increase NOAA's observational capacity for high impact weather, polar, and marine observing by transitioning cost-effective UAS solutions into routine operations. This program helps NOAA: collect data on Arctic ice change and effects on ecosystems; improve flood and drought forecasts; and monitor important fishery habitats. NOAA partners with other Federal and state agencies, academia, and private companies to test and evaluate a variety of UAS that could be part of a future NOAA fleet.

#### **Performance:**

Performance evaluation is an integral part of OAR's business process. OAR uses the performance management process to align resources, systems, and workforce to achieve research based objectives and priorities for the Nation. The effectiveness of these investments is assessed using numerous internal and external performance measures including the Government Performance and Results Act (GPRA) and other performance measures. In the table below, there is a listing of OAR-led GPRA metrics that cross multiple laboratories and programs.

<b>OAR GPRA measures</b>	<b>FY 2015 Actuals</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Annual number of peer-reviewed publications related to environmental understanding and prediction ( <i>NOAA total</i> ) - <b>Indicator 3.1</b>	1860	1500	1500	1500	1500	1500	1500
Uncertainty of the North American (NA) carbon sink to better understand the contribution of human activities toward increasing atmospheric CO2 and methane - <b>Indicator 3.1</b>	410 M tons Carbon /Yr	405 M tons Carbon/Yr	400 M tons Carbon/Yr	400 M tons Carbon/Yr	390 M tons Carbon/Yr	385 M tons Carbon/Yr	380 M tons Carbon/Yr
Error in global measurement of sea surface temperature (°C) - <b>Indicator 3.1</b>	0.52	0.59	*	*	*	*	*
Annual percentage of U.S. states and territories that use NOAA climate information and services to improve decision-making in the face of a changing climate - <b>Indicator 3.1</b>	25%	27%	*	*	*	*	*
Improved climate model performance and utility based on model advancements (planned milestones) and climate assessments benefited (number of models and assessments)- <b>Indicator 3.1</b>	24	18	*	*	*	*	*
Percentage improvement in the Quality of Relationship between engagement personnel and the public they serve - <b>Indicator 3.1</b>	n/a	77	*	*	*	*	*
Number of forecast and mission improvements, based on OAR research, to weather applications at operational U.S. weather services and in the U.S. weather commercial sector - <b>Indicator 3.1</b>	12	9	9	9	9	9	9

Annual economic and societal benefits from Sea Grant activities as measured by jobs created/retained ( <i>reported by each individual Sea Grant College</i> ) - <b>Indicator 3.1</b>	10,700	9,600	9,600	9,600	9,600	9,600	9,600
Annual number of Climate Program Office peer-reviewed publications related to climate understanding and prediction - <b>Indicator 3.1</b>	747**	300	300	300	300	300	300

Note: \*Discontinued as a GPRA measure in the FY 2016 President's Budget

Note: \*\*The FY2015 measure counted "number of studies" and it has since been revised for FY 2016 to align with OAR standards to measure the narrower group of "peer-reviewed publications."

**Significant Inflationary Adjustments:**

NOAA's FY 2017 Base includes an increase of \$3,037,000 and 2 FTE to account for the full funding requirement for inflationary adjustments to current programs for OAR activities. This includes the estimated 2017 Federal pay raise of 1.6 percent as well as inflationary increases for non-labor activities, including service contracts, utilities, field office lease payments, and rent charges from the General Services Administration (GSA).

NOAA also requests the following transfer for a net change of \$0 and 0 FTE to the agency:

From Office	PPA	To Office	PPA	Amount/FTE
MS	Mission Services and Management	OAR	Weather & Air Chemistry: Laboratories & Cooperative Institutes	\$4,017,000/0 FTE

NOAA requests to transfer \$2,872,000 and 0 FTE to move funding for operations at the David Skaggs Research Center in Boulder, CO, from the Mission Support Facilities to OAR. This funding is currently appropriated to the Mission Services and Management PPA and then distributed to the Line and Staff Offices annually. This reallocation will increase efficiencies by eliminating the need for funding transfers subsequent to appropriation and will improve transparency.

NOAA requests to transfer \$1,145,000 and 0 FTE to move funding associated with NOAA's Western Regional Center (WRC) management activities from Mission Support Facilities to OAR. Currently, costs for these activities are paid directly through the funding appropriated to the Mission Services and Management PPA. This reallocation supports NOAA's plan to employ an integrated campus cost model to allocate the cost of services to the WRC tenants. The tenants will then be billed directly based on the approved cost model. An integrated cost model will provide greater transparency and a more accurate reflection of program operating costs.

**APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES**  
**SUB-PROGRAM: CLIMATE RESEARCH**

The mission of the Climate Research sub-program is to monitor and understand Earth's climate system to predict potential long-term changes in global climate as well as shorter-term climate variations that are of societal and economic importance. NOAA's climate research activities are authorized under the National Climate Program Act and the Global Change Research Act.

The objectives of the Climate Research sub-program are to:

- describe and understand the state of the oceans and climate through sustained atmospheric and oceanic observations and research;
- understand and predict ocean and climate variability and change from weeks to decades to centennial timescales; and
- incorporate research into information and products, ranging from short-term weather forecasts to longer-term climate forecasts and assessments to improve the ability of decision makers and communities to plan for and respond to climate variability and change.

The following Programs, Projects and Activities (PPA) are included in the Climate Research Sub-program: Climate Research Laboratories and Cooperative Institutes, Regional Climate Data and Information, and Climate Competitive Research.

**LABORATORIES AND COOPERATIVE INSTITUTES**

Climate Research predicts the future evolution of the Earth to inform decision making. Such predictions require comprehensive understanding of physical and chemical processes that shape the climate. OAR's Laboratories and Cooperative Institutes efforts improve understanding, through the development and testing of state-of-the-art Earth System Models.

The following OAR laboratories are funded under this PPA:

**Earth System Research Laboratory (ESRL)**

ESRL was formed to pursue a broad and comprehensive understanding of the Earth system, including the atmosphere, ocean, and the changing climate system and its impacts.

**Physical Sciences Division (PSD)/ESRL**

PSD's core mission is to conduct physical science research to advance NOAA's capacity to observe, understand, and predict the physical behavior of the Earth system (e.g., atmosphere, ocean, cryosphere, hydrosphere, land) and related impacts on global-to-local scales and over timescales ranging from days to decades.

**Chemical Sciences Division (CSD)/ESRL**

CSD, in partnership with the Cooperative Institute for Research in Environmental Sciences (CIRES), conducts studies that are fundamental to understanding and predicting the Earth's climate, U.S. air quality, and the status of the stratospheric ozone layer. Research focuses on understanding and quantifying man-made and natural emissions of gases and particles into the atmosphere, chemical and physical processes that alter the composition of the atmosphere, and the distribution of pollutants throughout the atmosphere.

### **Global Monitoring Division (GMD)/ESRL**

GMD, in partnership with CIRES, researches global distributions of and trends in atmospheric compounds capable of forcing change in Earth's climate and environment. GMD also operates six Atmospheric Baseline Observatories, which have been collecting 250 measurements of atmospheric trends for over 50 years. This research enhances society's ability to plan for and respond to climate change and related impacts.

### **Geophysical Fluid Dynamics Laboratory (GFDL)**

GFDL conducts comprehensive, long lead-time research on climate and the Earth system to better understand natural climate variability and anthropogenic-related climate change. GFDL uses mathematical models and high-performance computer simulations to understand dynamics of the atmosphere, ocean, biosphere, and cryosphere and make projections about future ecosystems, atmospheric composition, and air quality.

### **Atlantic Oceanographic and Meteorological Laboratory (AOML)**

AOML uses ocean and atmospheric observations and models to understand and characterize the role of the oceans in climate variability and change.

### **Pacific Marine Environmental Laboratory (PMEL)**

PMEL improves scientific understanding of the changing climate system and its impacts by providing the core capabilities of research, technology development, and observing system implementation that are central to meeting NOAA's climate goals.

### **Air Resources Laboratory (ARL)**

ARL investigates how the interactions between the atmosphere and the underlying land surface influence and are influenced by climate. ARL measures key physical and chemical processes that influence climate, such as the interaction of water in the atmosphere, soil, and plants.

### **Schedule and Milestones Highlights:**

FY 2017 – 2021

- Publish updates on Annual Greenhouse Gas Index, Ozone Depleting Gas Index
- Apply new Earth system modeling for tipping point prediction in global estuarine, coastal, and benthic ecosystems
- Deploy and maintain an array of 1,200 surface drifters
- Maintain 38 existing CO<sub>2</sub> and OA moorings and deploy an average of 1 additional mooring each year to the network
- Complete 1-2 hydrography cruises annually

### **Deliverable Highlights:**

- Long term global records of greenhouse gases, stratospheric ozone, and aerosols
- South Pole Ozone hole updates
- A global high-resolution multi-model diagnostic capability to assess changes in the frequency and intensity of extreme events (e.g., heat waves, droughts, floods)
- A high-resolution prototype seasonal-to-interannual prediction system of future marine ecosystem variability
- Prototype decadal forecasts and predictions, including nine with high resolution couple climate models

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Increase cumulative number of regions for which a surface flux study has been conducted	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	3	4	5	6	7	8	9
<b>Description:</b> “Surface flux” refers to the exchange of energy (e.g., heat) and substances (e.g., water) between the land surface and the atmosphere. These fluxes are critical drivers of climate change because they affect air and land temperatures and other important aspects of the climate. These fluxes also drive important climate-related phenomena such as droughts and such weather-related phenomena as the development of storms. Surface fluxes vary significantly with surface and weather conditions.							

<b>Performance Measure:</b> Cumulative number of new regional scale projections for long-term weather assessments and decision support	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	3	3	6	7	8	9	10
<b>Description:</b> The number of meaningful regional projections will increase as NOAA’s Earth System Model increases in realism and complexity. Examples of regional scale projections include: regional sea level rise projections that require explicit representation of the global eddy field in the ocean models; projections of parameters essential to ocean and coastal ecosystem forecasting; assessment of regional carbon budgets; and projections of climate change in the Arctic region that require improved sea ice models.							

<b>Performance Measure:</b> Reduce percentage uncertainty in possible 21st century sea level rise (0-1m = 100% uncertainty) to enable government and industry to mitigate the impact of projected sea level rise	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	75%	70%	65%	60%	55%	50%	45%
<b>Description:</b> This metric is calculated using the IPCC 4th Assessment Report estimates for the range of 21st century global-mean sea level rise. Completion of the proposed effort will reduce the uncertainties by almost half as a result of modeling that better captures the more accurate measurements of ice-sheet discharge, thermal expansion, and regional anomalies due to ocean circulation and heat storage. Reducing the uncertainty in sea level rise will allow government and industry to have better information on projected sea level rise and therefore tailor their planning and actions to address the impacts.							

<b>Performance Measure:</b> Increase cumulative number of CSD reports to stakeholders and decision makers that provide a policy-relevant scientific synthesis of results from intensive field studies, process studies, and analyses	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	6	6	6	7	7	8	8
<b>Description:</b> CSD reports provide a distillation of key scientific findings on emissions, transport, atmospheric processing, and impacts of climate forcing agents, their precursors and species related to air quality degradation to inform policy development and emission management strategies for climate and air quality. Recent stakeholders include the Texas Commission on Environmental Quality (TCEQ) and the California Air Resources Board (CARB). In 2015, CSD provided to the state of Utah Department of Environmental Quality and to the Western Energy Alliance a policy-relevant report synthesizing scientific findings from three field missions conducted (2012-2014) to understand the causes of unusual high winter ozone levels that exceed national air quality standards.							

## **REGIONAL CLIMATE DATA AND INFORMATION**

NOAA's Regional Climate Data and Information Program supports activities that improve resilience and preparedness throughout the US and abroad through the use of climate knowledge and information. This research advances the Nation's understanding of climate-related risks and vulnerabilities across sectors and regions, and the development of tools to foster more informed decision making.

NOAA supports the following programs under the Regional Climate Data and Information Program:

- The **U.S. Climate Reference Network (USCRN)** provides baseline, high-quality surface observations of air temperature and precipitation to detect long-term changes in climate through a robust climate record.
- The **National Integrated Drought Information System (NIDIS)**, established by the National Integrated Drought Information System Act of 2006, to provide accessible drought information for the Nation through improved drought monitoring and forecasting capabilities.
- NOAA's **Observing System Monitoring Program** provides early detection and remediation of network problems that can adversely affect the quality of data records and diminish the ability to evaluate climate variability and change.
- NOAA's **Assessment Services Program** provides various climate assessments in a timely, sustained, and repeatable manner for a wide range of audiences.
- The **Climate Model Data Archive** provides a single point of access to NOAA climate datasets.
- The **NOAA Climate.gov** Portal provides easy public access to NOAA and its partners' climate science, data, and information services. Climate.gov also hosts and supports the U.S. Climate Resilience Toolkit ([toolkit.climate.gov](http://toolkit.climate.gov)), called for in the President's Climate Action Plan.
- The **Communications and Education Program** manages and maintains NOAA Climate.gov, and is actively working to build NOAA and its partners' capacity for climate communication, education, and engagement.
- The **Arctic Research Program (ARP)** focuses on sustained observations and retrospective analysis of key variables in the Arctic region's atmosphere, ocean, and sea ice cover to document, detect, and evaluate impacts of climate change.
- The **National Climate Predictions and Projections Platform** accelerates the application of knowledge about climate variability and change at regional and local spatial scales to adaptation and preparedness efforts.
- **Climate and Societal Interactions (CSI)** funds internal and external research and development programs. CSI enhances capacity among decision makers to effectively co-produce and utilize climate information in risk management, adaptation and development.

### **Schedule and Milestone Highlights:**

FY 2017 – 2021:

- Improve drought indicators and indices in support of the Regional Drought Early Warning Information System
- Conduct climate training for tribal communities in the Southern U.S.
- Develop and publish case studies in the CRT highlighting businesses, communities, and resource managers taking action to build resilience
- Public engagement series to help citizens and stakeholders understand their



vulnerability to extremes of weather, climate and the environment and the tools available to help them adapt and build resilience

- Carry out repeat of the Chukchi Sea during the second decade of the RUSALCA program

**Deliverables:**

- Experimental drought indicators based on decision making needs in the NIDIS Pilot regions
- A Pacific Arctic Climate Observing System
- Forty total interoperable drought systems accessible through the U.S. Drought Portal
- Seven total Arctic system data products that describe the changes in time of Pacific and Atlantic water fluxes in the Arctic Ocean to clarify the causes and consequences of Pacific Water influx into the Arctic Ocean
- Increased skill and capacity among stakeholders in businesses and communities to build resilience to climate-related impacts

**Performance Goals and Measurement Data:**

***NIDIS Early Warning Systems (to support Regional Services delivery)***

<b>Performance Measure:</b>	<b>FY 2015</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
Increase cumulative number of states and territories to incorporate NOAA drought early warning information into their drought adaptation and mitigation plans	10	15	22	22	26	26	26
<p><b>Description:</b> This performance measure is based on the number of states and territories that partner with NIDIS to incorporate drought early warning information into their drought planning activities. Activities that count toward this measure include: local or regional drought planning/management groups; use of tailored information from the U.S. Drought Portal to establish drought indicators and set management triggers in state and territory drought adaptation and mitigation plans; and incorporation of information from basin specific drought monitors developed through the drought early warning information systems into either state and territory drought adaptation and mitigation plans or as part of state and territory drought planning and management groups.</p>							

### NOAA Climate.gov Portal

<b>Performance Measure:</b> Annual percentage growth in number of visits to NOAA's Climate Portal	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	83%	FY 2015 +10%	FY 2016 +10%	FY 2017+ 10%	FY 2018+ 10%	FY 2019+ 10%	FY 2020 +10%
<b>Description:</b> This performance measure will show the ongoing increase in the average number of visits to NOAA Climate.gov among the Portal's four target audiences. The average number of monthly visits in FY 2014 was 249,918, a 72% increase over FY 2013. The average number of monthly visits in FY2015 was 457,851, an 83.2% increase over FY 2014. NOAA's Climate.gov provides easy to access and understand scientific data and information about Earth's climate system.							

### Communication and Education

<b>Performance Measure:</b> Percentage improvement in the Quality of Relationship between engagement personnel and the public they serve - <b>Indicator 3.1</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	n/a	77	n/a	79	n/a	81	n/a
<b>Description:</b> The Quality of Relationship (QoR) index measure is comprised of five elements: awareness, trust, satisfaction, use/usability, and control mutuality. The QoR index ranges from 0-100. The goal is to monitor and increase the Quality of Relationship with each of NOAA's priority publics as they access, understand, and integrate climate information, products, and services into their decision-making. The measure is made via a combination of surveys and focus groups to establish a baseline measurement with biennial follow-up measurements to determine the percentage improvement in the QoR as climate services are increased and improved. In our last QoR measure, Climate.gov scored a 76.2 whereas our target was 75. In FY 2016, the team will implement Phase 3 site redesigns and developments based on user feedback and then we will conduct our next QoR evaluation in FY 2017 — with a target of 77.							

### Climate & Societal Interactions

<b>Performance Measure:</b> Annual percentage of U.S. states and territories that use NOAA climate information and services to improve decision making	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	25%	27%	29%	29%	30%	30%	30%
<b>Description:</b> Number of states and territories where climate information is integrated into state and territory planning and decision making (e.g., changes in policies, plans, and actions), as well as indicators of success such as training and technical assistance. Percentage of improvement in state and territory resilience to climate hazards.  The measure accounts for all 50 states and five U.S. territories.							

## **CLIMATE COMPETITIVE RESEARCH**

Climate Competitive Research funds high-priority climate science through a competitive selection process to advance the understanding of Earth's climate system as well as the impacts on society. This program also provides strategic guidance and oversight for NOAA's climate science and services programs. Competitive grant efforts within Climate Competitive Research are organized within five activities:

### **Earth System Science (ESS)**

ESS provides process-level understanding of NOAA's Earth climate system through observation, modeling, research analysis, and field studies to support the development of improved climate models and predictions. ESS-sponsored research is carried out at NOAA and other Federal laboratories, NOAA Cooperative Institutes, academic institutions, and private research companies.

### **Modeling, Analysis, Predictions, and Projections (MAPP)**

MAPP improves models of Earth system processes, and tests model capabilities to make them more relevant to decision makers. MAPP offers targeted infrastructure support, operates a competitive grants program, encourages community interaction through task forces and webinars, and supports mechanisms that enable the transference of research findings into NOAA's operations.

### **Climate and Societal Interactions (CSI)**

CSI improves resilience and preparedness in diverse socio-economic regions and sectors throughout the U.S. and abroad. Our research advances the Nation's understanding of various climate-related risks and vulnerabilities to inform risk management. CSI enables scientists and decision makers to effectively co-produce and utilize climate information in risk management, adaptation and development.

### **Climate and U.S. Fish Stocks**

This program advances understanding and projection of the impacts of climate variability and change on fish stocks, prey availability, and habitat and supports sustainable fisheries management.

### **Schedule, Milestone and Deliverables Highlights:**

FY 2017 – 2021:

- Expand Earth system data collection for cryospheric, boundary layer properties, hydrometeorological, and oceanic process studies
- Obtain precise, robust, routine, and relevant observations of the Earth system at the time and space scales required to diagnose its behavior and to assess the skill of predictive forecast tools
- Increase cumulative number of science-based adaptation tools and technologies that are used by NOAA partners and stakeholders to improve ecosystem-based management of fisheries to five

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Annual number of states or territories using new or tailored NOAA climate services (tools, information, technical assistance, or products)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	8	9	10	11	12	13	14
<b>Description:</b> The number of products and services, provided or existing products and services that are modified/expanded for new user groups or regions. "Products and services" includes technical assistance, training, and guidance documents to enable planning and decision making.							

<b>Performance Measure:</b> Annual number of regionally and sectorally focused climate impacts and adaptation studies communicated to decision makers	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	31	31	31	31	31	31	31
<b>Description:</b> Number of peer-reviewed publications and reports published and released in one fiscal year. The publications/reports are developed through interaction with and/or communication to stakeholders. Publications and reports are collected from investigators conducting climate impacts and adaptation research in cooperation with stakeholders. The goal of this research is to better understand and enhance the use of NOAA products and information to meet user requirements for natural resource management information in various sectors (e.g. drought and water resources, fire risk, ecosystem and coastal impacts, sea-level rise, human health, agriculture, etc.).							

## **PROGRAM CHANGES FOR FY 2017:**

### **Climate Laboratories and Cooperative Institutes: Atmospheric Baseline Observatories (Base Funding: \$7,200,000 and 12 FTE; Program Change: +\$3,000,000 and 0 FTE):**

NOAA requests an increase of \$3,000,000 and 0 FTE for a total of \$10,200,000 and 12 FTE to maintain 50+ years of sustained observations and research at NOAA's six Atmospheric Baseline Observatories (ABO), which document trends and distributions of atmospheric constituents influencing global climate, ozone depletion, and changes in baseline air quality.

#### **Proposed Actions:**

The proposed investment will allow NOAA to return all six ABOs to full operations. The ABOs are at operational risk due to rising operational costs owing to the remote locations of these sites, deterioration and extreme weathering of structures over decades of use, increasing instrumentation requirements, and rising needs to upgrade data collection, distribution, and analysis capabilities. In addition to these rising costs is the decline in funding support from partnering agencies. The National Science Foundation (NSF) historically provided significant logistical support at the South Pole and Greenland ABOs, but is no longer able to do so in full. The South Pole ABO was established in 1956; NOAA's support for this ABO is now approaching \$1 million year.

NOAA began assuming increasing costs to the South Pole and Greenland ABOs in FY 2015. This includes the cost of transporting staff and supplies, building replacement, and ongoing maintenance. Resources from other already struggling ABOs have been diverted to pay for these rising costs at the South Pole and Greenland observatories. Similar issues are present at the ABO in Barrow, AK, where uncertainty over future Department of Energy (DOE) contributions and deferred maintenance from NOAA challenge operations.

These challenges have reduced monitoring programs and unsustainably deferred maintenance across all ABOs. This degradation now threatens to further erode capabilities for obtaining long-term, high-quality measurement records, which have a robust 50+ year history of sustained observations – a service that remains timely and relevant today.

#### **Statement of Need and Economic Benefits:**

NOAA's ABOs are the backbone of NOAA's efforts to monitor atmospheric constituents that influence global pollutant transport, climate change, ozone depletion, and baseline air quality.

With 50+ years of sustained atmospheric observations, the ABOs maintain a record of quality and duration. Historically, these facilities were the first to confirm the appearance and growth of the Antarctic ozone hole, showed exponential increase in global GHGs, documented transport of Asian pollution to the U.S., and pointed to the manmade chemicals causing ozone destruction. They currently help ensure continued recovery of the ozone layer under the U.S. Clean Air Act requirement to monitor and report on ozone and ozone-depleting gases. More recently, the Trinidad Head Observatory has identified atmospheric pollutants entering the western U.S. from burgeoning economies in Asia. Today, several products, unique to the ABOs, provide valuable tracking information, including the NOAA Annual Greenhouse Gas Index (AGGI) and the Ozone Depleting Gas Index (ODGI).

Data provided by the ABOs is used by more than 500 partners and stakeholders, including international organizations, universities, other Federal agencies, and public and private

organizations. ABO data sets have been cited in thousands of peer-reviewed research papers since their inception and are fundamental components of national and international assessments.

Because unknown future environmental changes are likely to be significant, continuing these high quality observations remain important in the coming decades. The ABOs provide historical context to the trends and magnitude of those changes and serve as the basis for understanding and predicting the degree of change in the future. For example, the steadily rising, 50+ year-long carbon dioxide record from Mauna Loa – known as the Keeling curve, along with other greenhouse gases, black carbon, and aerosols, form the basis for understanding our changing climate. Sustaining these long-term records is essential for understanding changes in the Earth System and is necessary for international negotiations and national decisions on climate, ozone-depletion, and air quality.

#### **Resource Assessment:**

The resources for this activity are described in the Climate Research narrative. To provide the most efficient observational coverage, the ABO sites were chosen specifically to cover a “pole-to-pole grid” at sites representative of the atmosphere in each regional location, providing maximum benefit with as few sites as possible. The requested resources in FY 2017 are needed to continue to support NOAA’s 50+ year effort of sustained observations and research.

#### **Schedule and Milestone Highlights:**

FY 2017

- Address the most significant infrastructure needs and replace aging equipment and data delivery systems
- Incorporate primary logistical responsibilities formerly provided by other Federal agencies

FY 2018

- Introduce upgrades in renewable energy at American Samoa and Mauna Loa for long term sustainability, reduced costs, and efficiency
- Improve infrastructure and facilities at Trinidad Head to ensure long-term monitoring of pollutants from Asia

FY 2019 - 2021

- Improve measurement programs at Barrow and Summit ABOs for monitoring and understanding the increasingly diverse and rapid changes in the Arctic

#### **Deliverable Highlights:**

- High quality measurements of greenhouse gases, aerosols, halocarbons, ozone, and solar radiation collected over the next decade at the six baseline stations in a way that ensures data are completely compatible with existing records and future measurements
- Improve measurement efficiency, energy conservation, and safety at all ABOs
- Expanded measurements at the Summit, Greenland, observatory to better monitor arctic processes and air pollution, especially black carbon entering the Arctic from Europe
- Improved capability of aerosol instrumentation, methane and other non-CO2 measurements, total ozone, solar radiation, and stratospheric lidar instrumentation at all observatories
- Near-real time data streams to support weather and climate analyses and model development

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Globally Distributed Manned Atmospheric Baseline Observatories (# of sites that monitor 200+ atmospheric parameters)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	6	6	6	6	6
<b>Without Increase</b>	6	6	6	4	4	2	2
<b>Description:</b> Four out of six NOAA Atmospheric Baseline Observatories currently have the capability to monitor the full suite of 200+ atmospheric parameters. With an increase of support, all six can be brought up to the full monitoring suite. Without an increase, a reduction in capability and capacity will be required at two ABOs.							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Climate Research  
**Program Change:** Atmospheric Baseline Observatories

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	0	31,874
11.5	Other personnel compensation	0	899
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>\$0</u>	<u>\$32,773</u>
12	Civilian personnel benefits	0	7,679
13	Benefits for former personnel	0	123
21	Travel and transportation of persons	30	897
22	Transportation of things	45	723
23.1	Rental payments to GSA	0	959
23.2	Rental Payments to others	0	691
23.3	Communications, utilities and misc charges	20	945
24	Printing and reproduction	0	142
25.1	Advisory and assistance services	0	951
25.2	Other services	550	3,464
25.3	Purchases of goods & services from Gov't accounts	0	3,479
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	750	750
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	500	3,102
31	Equipment	600	1,508
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	505	5,234
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>3,000</u>	<u>63,420</u>

Due to financial system limitations, the object class detail for the Program reflects the Climate Competitive Research PPA



**Climate Laboratories and Cooperative Institutes: Greenhouse Gas Monitoring (Base Funding: \$60,420,000 and 192 FTE; Program Change: \$2,975,000 and + 1 FTE):** NOAA requests an increase of \$2,975,000 and 1 FTE for a total of \$ 63,395,000 and 193 FTE to enhance and sustain an observation and analysis system necessary to determine uptake and emissions of carbon dioxide and greenhouse gases (GHGs) across North America.

**Proposed Actions:**

NOAA will establish a more robust network of sensors and carbon cycle modeling by increasing the number of locations and frequency of high quality observations of atmospheric carbon taken at these locations. In addition, NOAA will expand the suite of gas measurements from ground-based and tower platforms to include methane, carbon isotopes, CFC replacements, and other tracers. These efforts will be implemented in partnership with private industry, NOAA's Cooperative Institutes and others.

The network will continue measuring the atmospheric composition of gases to increase understanding of the carbon cycle. An enhanced network will enable NOAA to improve measure resolution between ocean and land-based GHG contributions, precisely determine absorption and emission of carbon at more fine scales, modernize instrumentation and analytical techniques, improve Earth System and carbon models, and validate retrievals by emerging satellite-techniques.

The enhanced network will also contribute substantially to on-going national and global efforts, such as the USGCRP North American Carbon Program (NACP; <http://www.carboncyclescience.us>), to better understand and integrate carbon cycle information. This will also inform an Integrated Global Greenhouse Gas Information System (IGIS) developed with partnering agencies and institutions to support global connectivity of observing and information systems. The enhanced observing and analysis system will serve as a model for other nations and regions across the world in their efforts to better understand the carbon cycle and the role of humans in it.

**Statement of Need and Economic Benefits:**

Past large-scale efforts to reduce GHG emissions to combat issues like poor air quality and acid rain highlighted the need for consistent, independent, scientific monitoring to verify results and drive policy decisions. Many states and regions, cities, and businesses in the United States have enacted plans for managing GHG emissions. For such efforts, high quality, coordinated atmospheric observational information on GHGs enables managers and policy-makers implementing these emission reduction efforts to monitor their progress and determine what strategies work. These atmospheric observations will be at the core of all analyses, predictions, and plans going into the future and it is essential that they are comprehensive and of the highest quality.

**Resource Assessment:**

NOAA's Global Monitoring Division, in partnership with CIRES and other stakeholders, conducts sustained observations and research to understand the global distributions, trends, sources, and sinks of atmospheric constituents that are capable of forcing change in Earth's climate and environment. For more information on the resources associated with these activities, see the Climate Research narrative.

**Schedule and Milestone Highlights:**

FY 2017- FY 2018

- Issue grant to acquire an accelerator mass spectrometer (AMS) optimized for <sup>14</sup>C measurements
- Sign contracts for the construction of 50 automated air sampling packages over two years (proven design, 12 samples in each package) to create the capacity for taking the additional samples from which CO<sub>2</sub> will be extracted for <sup>14</sup>C measurements
- Increase sample extraction, sample processing, and data management infrastructure

FY 2019

- Begin full time operation of accelerator mass spectrometer (AMS)

FY 2020-2021

- Measure 5,000 <sup>14</sup>CO<sub>2</sub> samples

**Deliverable Highlights:**

- An expanded network of 16 tall and medium height towers (8 NOAA, 8 private sector) measuring the full suite of greenhouse gases continuously across North America by 2020
- Satellite retrieval verification capability in place with expanded sampling and tower coverage
- Fully operating accelerator mass spectrometer (AMS)
- On-going <sup>14</sup>CO<sub>2</sub> measurements at +70 sites

**Performance Goals and Measurement Data:**

<b>Performance Goal:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Uncertainty of the North American carbon sink to better understand the contribution of human activities toward increasing atmospheric carbon dioxide and methane (million tons carbon/year) (Measure 3.1f)							
<b>With Increase</b>	N/A	N/A	395	390	385	380	375
<b>Without Increase</b>	410	405	400	400	390	385	385

**Description:** Please see measure description under the Annual Performance Plan (APP) under section Targets and Performance Summary. Higher values indicate higher uncertainty in the North American carbon sink.

<b>Performance Measure:</b> Number of sites supporting frequent <sup>14</sup> CO <sub>2</sub> Measurements	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	12	45	60	65	70
<b>Without Increase</b>	12	12	12	12	12	12	12
<b>Description:</b> The number of sites sampled represents NOAA's capacity to attribute emissions to both regions and economic sectors, predominantly within North America. While NOAA analyzes for CO <sub>2</sub> and many greenhouse gases at all sites, samples are currently collected for C-14 analysis at only 12 of these. With more sites, smaller regions can be targeted. These sites include tall towers and weekly aircraft profiles.							

<b>Performance Measure:</b> Number of samples extracted per year for <sup>14</sup> CO <sub>2</sub> analyses	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	2,000	2,000	3,500	5,000	5,000
<b>Without Increase</b>	700	700	700	700	700	700	700
<b>Description</b> This measure represents NOAA's capacity to evaluate fossil fuel vs. "natural" emissions in both space and time. With samples collected more frequently from a larger number of sites, NOAA will be able to provide needed information on policy-relevant scales. Samples to be analyzed by AMS first require extraction, a meticulous process involving several steps. Extraction capacity will be increased even before the AMS is acquired, as, once extracted, samples can be safely stored before analysis. This allows the measurement record to begin even before the analytical capacity is fully developed.							

**PROGRAM CHANGE PERSONNEL DETAIL**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Climate Research  
**Program Change:** Greenhouse Gas Monitoring

<b>Title:</b>	<b>Location</b>	<b>Grade</b>	<b>Number of Positions</b>	<b>Annual Salary</b>	<b>Total Salaries</b>
Physical Scientist	Boulder, CO	ZP-IV	1	90,779	90,779
Subtotal			<u>1</u>		<u>\$90,779</u>
Less Lapse	25%		<u>0</u>		<u>(\$22,695)</u>
Total Full-time permanent:			1		\$68,084
2017 Pay Adjustment	1.6%				\$1,089
<b>TOTAL</b>			1		\$69,173
<b>Personnel Data</b>			<b>Number</b>		
Full-time Equivalent Employment					
Full-time permanent			1		
Other than full-time permanent			0		
<b>Total</b>			<u>1</u>		
Authorized Positions:					
Full-time permanent			1		
Other than full-time permanent			0		
<b>Total</b>			<u>1</u>		

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Climate Research  
**Program Change:** Greenhouse Gas Monitoring

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	69	31,943
11.5	Other personnel compensation	0	899
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>\$69</u>	<u>\$32,842</u>
12	Civilian personnel benefits	23	7,702
13	Benefits for former personnel	0	123
21	Travel and transportation of persons	15	882
22	Transportation of things	18	696
23.1	Rental payments to GSA	0	959
23.2	Rental Payments to others	15	706
23.3	Communications, utilities and misc charges	5	930
24	Printing and reproduction	0	142
25.1	Advisory and assistance services	0	951
25.2	Other services	0	2,914
25.3	Purchases of goods & services from Gov't accounts	0	3,479
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	1,000	1,000
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	2,602
31	Equipment	495	1,403
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	1,335	6,064
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>2,975</u>	<u>63,395</u>

Due to financial system limitations, the object class detail for the Program reflects the Climate Competitive Research PPA

**Climate Laboratories and Cooperative Institutes: U.S. Global Change Research Program (Base Funding: \$60,420,000 and 192 FTE; Program Change: \$ 4,518,000 and 1 FTE):**

NOAA requests an increase of \$4,518,000 and 1 FTE for a total of \$64,938,000 and 193 FTE to support the U.S. Global Change Research Program's priority research areas. This will expand NOAA's capabilities for improved understanding of weather and climate extremes and marine ecosystem tipping points.

**Proposed Actions:**

Extreme events and ecosystem disruptions can have profound impacts on communities, coastal industries, and more. With increased investment NOAA can provide decision-makers the best available information to predict and reduce those risks in a changing climate.

*Extremes Research:* Extreme climate and weather events such as heat waves, droughts, and floods can result in loss of life, property, and natural habitat. Building on recent investments, this increase will further NOAA's capability to explain and predict high-impact weather and climate events by providing new information products to support policy development, decision-making, and resource management. These products will provide access to the best available information to understand risks related to extreme events in a changing climate. NOAA will also accelerate research to provide timely climate attribution assessments, climate predictability assessments, and the implementation of a global multi-model approach to resolve and to predict the behavior of extreme events.

*Marine Ecosystem Tipping Point Research:* Climate variability and change, in combination with non-climatic stressors, such as pollution, over-use, and habitat destruction, can lead to abrupt changes in structure, function, and services of marine ecosystems. NOAA will accelerate the development and broad application of Earth System Models (ESMs) and other tools to understand where, when, and how marine ecosystems may reach critical tipping points. Such tipping points could significantly affect the seafood industry, coastal tourism and recreation, and other ocean-dependent communities. Some specific target areas for these efforts include:

- Applying high-resolution ESMs to assess past and future marine ecosystem variability at regional scales;
- Use data assimilation to improve retrospective analyses of seasonal to decadal shifts in U.S. marine ecosystem productivity, structure, and function;
- Developing a prototype seasonal-to-interannual prediction system of future marine ecosystem variability;
- Developing indices of marine ecosystem condition to better track, assess, and provide early-warning of possible tipping points in U.S. marine ecosystems; and
- Enhanced ESM capabilities for understanding, predicting, and projecting ocean acidification.

**Statement of Need and Economic Benefits:**

Observations, research on extremes, and predictive modeling provide policy makers the best tools for decision making to reduce risks from extreme climate and weather events, and ecosystem changes.

*Extremes Research:* Without knowledge of the background conditions and processes leading to extreme climate and weather events, policy and decision makers cannot make informed decisions concerning how society should invest in critical infrastructure in risk-prone areas. In the past three years alone, the U.S. have experienced over 25 billion-dollar extreme events such as Hurricane Sandy and California's extreme droughts. This increase will expand NOAA's

capability to understand and predict weather and climate extremes and meet private and public sector demands for information and early warnings for extreme events.

*Marine Ecosystem Tipping Point Research:* An estimated 4 million metric tons of fish and shellfish are harvested in the United States each year<sup>1</sup>. Healthy ecosystems also play a key role in sustaining broader coastal tourism activities. In contrast, degraded ocean conditions and inadequate management of marine resources cost \$50 billion a year from overfishing, \$200 to \$790 billion a year from hypoxia, \$10 to \$90 billion a year from invasive species, and \$104 to \$182 billion a year from ocean acidification<sup>2</sup>. Rapid ecosystem changes threaten sustainable management of marine resources. Stakeholders such as regional fisheries managers and the seafood industry need improved information on the causes of changes to living marine resources, whether past changes are indicative of future conditions, and what, where, when and how systems might reach tipping points. This effort leverages NOAA's capabilities with partners to strengthen marine resource management through decision-support tools and other resources.

#### **Resource Assessment:**

The resources for this activity are described in the Climate Laboratories and Cooperative Institutes narrative.

#### **Schedule and Milestone Highlights:**

FY 2017 – 2019

- Delivery of global, high-resolution ocean simulation prototype for the retrospective analysis of multi-decadal marine ecosystem variability that is integrated with data-assimilative physics
- Development and experimental implementation of a global high-resolution prototype system for seasonal-to-interannual prediction of future marine ecosystem variability, including estuarine, coastal, and benthic ecosystems
- Double, relative to a 2016 baseline, the annual number of assessments on the causes and predictability of observed extreme climate and weather events, anomalies, and trends

FY 2020 – 2021

- Reduce by 50 percent, relative to a 2016 baseline, the lag time between when a climate or weather extreme event occurred and the completion of the assessments of causes and predictability
- Prototype an extreme climate and weather assessment delivery system to inform preparedness and manage future risk by providing systematic, readily understandable explanations of high-impact extreme events that are immediately available to support decision making

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<sup>1</sup> National Marine Fisheries Service, National Oceanic and Atmospheric Administration. 2011b. Annual Commercial Landing Statistics. [http://www.st.nmfs.noaa.gov/st1/commercial/landings/annual\\_landings.html](http://www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html) (accessed September 20, 2011)

<sup>2</sup> Global costs: Hudson, A. and Y. Glemarec, 2012: Catalysing Ocean Finance Volume I Transforming Markets to Restore and Protect the Global Ocean, United Nations Development Programme and Global Environment Facility, New York, NY and Washington, DC

**Deliverable Highlights:**

- Model-based diagnostic capabilities to resolve and predict the behavior of high-impact climate and weather extreme events
- Reliable, authoritative, routine and systematic explanations of the causes, predictability and likelihood of observed high-impact extreme climate and weather events for risk assessment and management decisions
- Peer-reviewed publications demonstrating improved scientific understanding of the linkages between a changing climate and its impact on marine ecosystems
- A global climate modeling capability to provide predictions and projections of marine ecosystem change, including potential tipping points, that delivers the best available science for guidance and early warning to inform resource management
- High-resolution, regional information on the evolution of oceanographic conditions and critical thresholds tailored to support regional ecosystem-based management activities

**Performance Measures:**

*Extremes Research:*

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Reduce lag time between climate and weather extreme events; assessment of their causes in order to improve timeliness of climate intelligence that can inform decision-making and risk management.							
<b>With increase</b>	N/A	N/A	7 months	6 months	5 months	3 months	3 months
<b>Without increase</b>	12 months	11 months	8-10 months	8-10 months	6-8 months	6-8 months	6-8 months
<b>Description:</b> Increasingly timely scientific explanations for the causes of climate and weather extreme events, which clarify which aspects of high impact extreme events are attributable to natural or to human causes, are needed to meet decision making timeframes for risk management, adaptation and policy responses.							



<b>Performance Measure:</b> Cumulative number of climate model simulations used to assess changes in extremes	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With increase</b>	N/A	N/A	360	420	480	540	600
<b>Without increase</b>	N/A	60	120	180	240	360	420
<b>Description:</b> A fully populated, continuously updated, multi-model, multi-representative concentration pathway emission scenarios, super-ensemble diagnostic modeling capability for climate assessments will advance NOAA's mission to develop scientific capabilities in order to provide a continuous delivery of knowledge and information for climate attribution and predictability assessments.							

<b>Performance Measure:</b> Number of attribution and predictability assessments of extreme weather and climate events, anomalies, and trends	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With increase</b>	N/A	N/A	8	8	10	10	11
<b>Without increase</b>	3	4	5	5	6	6	7
<b>Description:</b> Outlooks on seasonal to interannual timescales of high impact climate and weather extreme events for droughts, floods, heatwaves and cold outbreaks that are comparable to the existing NOAA hurricane season outlook annual and mid-season update.							

*Marine Ecosystem Tipping Point Research:*

<b>Performance Measure:</b> Publically available and useful marine ecosystem predictions and projections (cumulative number)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	350	500	650	800	1000
<b>Without Increase</b>	128	200	270	320	400	500	500
<b>Description:</b> Predictions and projections of marine ecosystem change, including potential tipping points, can provide insight and early warning to inform resource management. Ensuring that the information, products, models, and services developed are made widely available and usable will enhance the integration of best-available science into decision-making processes.							

<b>Performance Measure:</b> Peer-reviewed journal articles (cumulative number)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	22	32	42	52	62
<b>Without Increase</b>	8	12	18	24	30	36	42
<b>Description:</b> These publications provide the information needed by stakeholders, resource managers, and decision-makers to develop effective policies and adaptation strategies for climate impacts on marine ecosystems.							

<b>Performance Measure:</b> Contributions to assessments relevant to regional ecosystem- based management activities in the U.S.	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	6	6	8	8	10
<b>Without Increase</b>	2	2	3	3	4	4	5
<b>Description:</b> Regional scale projections will contribute to international assessments (e.g. IPCC AR5, released in 2013), national assessments under the U.S. Global Climate Research Program, and other assessments as requested. The number of meaningful regional projections possible will increase as NOAA's Earth System Model increases in realism and complexity. Examples of regional scale projections include: regional sea level rise projections that require explicit representation of the global eddy field in the ocean models; projections of parameters essential to ocean and coastal ecosystem forecasting; assessment of regional carbon budgets; and projections of climate change in the Arctic region that require improved sea ice models.							

**PROGRAM CHANGE PERSONNEL DETAIL**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Climate Research  
**Program Change:** U.S. Global Change Research Program

<b>Title:</b>	<b>Location</b>	<b>Grade</b>	<b>Number of Positions</b>	<b>Annual Salary</b>	<b>Total Salaries</b>
Physical Scientist	Boulder, CO	ZP-IV	1	90,779	90,779
Subtotal			<u>1</u>		<u>\$90,779</u>
Less Lapse	25%		<u>0</u>		<u>(\$22,695)</u>
Total Full-time permanent:			1		\$68,084
2017 Pay Adjustment	1.6%				\$1,089
<b>TOTAL</b>			1		\$69,173
<b>Personnel Data</b>			<b>Number</b>		
Full-time Equivalent Employment					
Full-time permanent			1		
Other than full-time permanent			<u>0</u>		
<b>Total</b>			1		
Authorized Positions:					
Full-time permanent			1		
Other than full-time permanent			<u>0</u>		
<b>Total</b>			1		

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Climate Research  
**Program Change:** U.S. Global Change Research Program

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	69	31,943
11.5	Other personnel compensation	0	899
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>\$69</u>	<u>\$32,842</u>
12	Civilian personnel benefits	23	7,702
13	Benefits for former personnel	0	123
21	Travel and transportation of persons	28	895
22	Transportation of things	0	678
23.1	Rental payments to GSA	0	959
23.2	Rental Payments to others	0	691
23.3	Communications, utilities and misc charges	0	925
24	Printing and reproduction	0	142
25.1	Advisory and assistance services	0	951
25.2	Other services	670	3,584
25.3	Purchases of goods & services from Gov't accounts	0	3,479
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	200	200
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	2,602
31	Equipment	0	908
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	3,528	8,257
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>4,518</u>	<u>64,938</u>

Due to financial system limitations, the object class detail for the Program reflects the Climate Competitive Research PPA

**Regional Climate Data and Information: NOAA Climate.gov Portal (Base Funding: \$1,350,000 and 0 FTE; Program Change: +\$2,300,000 and +1 FTE):** NOAA requests an increase of \$2,300,000 and 1 FTE for a total of \$3,650,000 and 1 FTE to continue development of the Climate.gov Portal in support of the Climate Resilience Toolkit (CRT), which provides a federal interagency website with public online access to actionable climate data, information, and tools to help communities plan for impacts of climate variability and change and extreme events.

**Proposed Actions:**

The CRT, the Federal interagency climate data and tools hub, was first published in November 2014 and version 1.0 of the CRT was completed in FY 2015 in collaboration with the Office of Science and Technology Policy, the Council on Environmental Quality, and the agencies in the U.S. Global Change Research Program.

Improvements funded by this request would make the Climate Resilience Toolkit more interactive and enhance its effectiveness through:

- A new map-based widget that expands listings of federal experts who offer decision-support services at the local/regional level.
- A new interactive, web-compatible client called “GeoSession” that allows Federal science agencies, businesses, and communities to share map layers, time-series, in situ data, and expertise in all-way, real-time engagements designed for knowledge-sharing, capacity building, and rapid response to emerging hazards.
- Version 2.0 of the ‘Climate by Location’ tool that allows users to quickly and easily produce climate statistics for any selected location.
- Certified online training courses tailored to teach professionals in various sectors, including agriculture, city planners, human healthcare and the U.S. homeland security community, what data and tools are available and how to use them to manage their risks and opportunities. These courses will be designed in partnership with professional societies and other entities that serve those sectors and will be integrated into learning progressions, designed to help businesses and communities build their knowledge, skill, and capacity to where they can readily integrate climate science data and tools into their own workplaces.
- Stakeholder engagements for resilience planning to help evaluate the CRT’s utility and effectiveness and to establish a “train the trainers” network, engaging groups such as Resilience AmeriCorps, Land Grant University’s Extension Agents, the Association of Climate Change Officers (ACCO), etc.
- Social media tools for science-based problem solving for societal benefit. The aim is to link together professionals’ online forums to enable different communities of practice to interoperate in ways that bridge cultural, geographic, political and discipline barriers for interdisciplinary science-based decision making for climate resilience.
- An on-demand Climate Literacy Learning Center for formal and informal educators to boost their climate literacy and capacity for incorporating climate science data and information into their jobs. NOAA will expand its partnership with the National Science Teachers Association (NSTA), other Federal science agencies, and relevant partners to provide on-demand professional learning resources and climate data for science teachers — mapped to grade and learning standards —with training on how to use these materials.
- A Quality of Relationship (QoR) assessment, which would provide a quantitative assessment of users’ awareness, trust, satisfaction, use/usability, and perception of control mutuality with the site. This multi-faceted quantitative evaluation would assess

the site's effectiveness and enable NOAA to evolve the site's scope and functionality based on user feedback.

- Close connection and coordination with the OSTP-led public-private partnership to advance climate preparedness and resilience to ensure CRT activities complement but do not replicate those efforts.

#### **Statement of Need and Economic Benefits:**

Every day, communities and businesses across the Nation grapple with environmental challenges due to unusual or extreme climate and weather conditions. In 2011 and 2012, the U.S. experienced 25 climate- and weather-related disasters in which damages exceeded \$1 billion (\$115 billion total)<sup>3</sup>. Stakeholders increasingly seek online information to understand and prepare for these events. From 2012 to 2013, for example, Climate.gov saw a 153 percent increase in site visits and a fourfold increase in questions about climate data for decision-making applications. However, users report having difficulty locating and using NOAA's online data products and services. Thus, NOAA seeks to improve accessibility of the site.

The tools added with these funds align well with the CRT's goals of building knowledge and capacity among its target users on how to find and use relevant science-based maps and data products for informed decision-making. With this investment we can directly respond to user needs and improve the general climate knowledge of the American public. Many of the functionalities, for example the 'Climate by Location' tool, directly respond to the additional capacity and data that our users are requesting. The Climate.gov builds knowledge and workplace skills through the online Climate Literacy Learning Center for formal and informal educators. This investment will also produce a more skilled workforce and climate-literate lifelong learners.

#### **Resource Assessment:**

Resources for this activity are described in the Regional Data and Information narrative.

#### **Schedules and Milestone Highlights:**

FY 2017

- Add "GeoSession" capability to the Climate Explorer
- Launch version 2.0 of the CRT and the Climate Widget, the Climate Literacy Learning Center, sector specific learning progressions that offer certificates of completion, and a redesigned Climate Explorer

FY 2019 – 2021

- Provide ongoing evaluation of new versions of the CRT and incorporate refinements and developments, based on user feedback into new versions
- Scale up the number and reach of CRT stakeholder engagements, focusing on building knowledge, skill, and capacity for using the CRT in resilience planning and implementation for businesses and communities

#### **Deliverable Highlights:**

- An enhanced Climate Explorer that provides access to climate projection data and geo-tagged case studies
- A Climate Widget

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<sup>3</sup> NOAA NCDC "Billion Dollar Weather / Climate Disasters." Online at <https://www.ncdc.noaa.gov/billions/events>. (Accessed Jan. 30, 2014)

- An expanded catalog of training courses, stitched together into purposeful learning progressions for building skill and capacity, with partners who offer certificates of completion
- An online discussion forum to facilitate knowledge-sharing between climate experts and stakeholders
- Standing up a Climate Literacy Learning Center that cross-walks with Climate.gov's "Teaching Climate" section

**Performance Goals and Measurement Data:**

***NOAA Climate.gov Portal***

<b>Performance Measure:</b> Annual percentage growth in number of visits to NOAA's Climate Portal	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	FY16+ 10%	FY17+ 10%	FY18+ 10%	FY19+ 10%	FY20 +10%
<b>Without Increase</b>	83%	FY15+ 10%	FY16+ 10%	FY17+ 10%	FY18+ 10%	FY19+ 10%	FY20 +10%
<b>Description:</b> This performance measure will show the ongoing increase in the average number of visits to NOAA Climate.gov among the Portal's four target audiences. The average number of monthly visits in FY 2014 was 249,918, a 72% increase over FY 2013. The average number of monthly visits in FY 2015 was 457,851, an 83.2% increase over FY 2014. NOAA's Climate.gov provides easy to access and understand scientific data and information about Earth's climate system.							

***U.S. Climate Resilience Toolkit***

<b>Performance Measure:</b> Annual percentage growth in number of visits to the NOAA-hosted Climate Resilience Toolkit (CRT).	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	FY16+ 10%	FY17+ 10%	FY18+ 10%	FY19+ 10%	FY20 +10%
<b>Without Increase</b>	32,696	FY15- 5%	FY16- 5%	FY17- 5%	FY18- 5%	FY19- 5%	FY20- 5%
<b>Description:</b> This performance measure will show the ongoing increase in the average number of visits to the CRT. The average number of monthly visits in FY 2015 was 32,696, which is our baseline year. The target average in FY 2016 will be 10% greater (35,966 per month).							

**Communication and Education**

<b>Performance Measure:</b> Percentage improvement in the Quality of Relationship between engagement personnel and the public they serve - <b>Indicator 3.1</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	77	N/A	79	N/A	80
<b>Without Increase</b>	75	N/A	75	N/A	75	N/A	75
<p><b>Description:</b> The Quality of Relationship (QoR) index measure is comprised of five elements: awareness, trust, satisfaction, use/usability, and control mutuality. The QoR index ranges from 0-100. The goal is to monitor and increase the Quality of Relationship with each of NOAA’s priority publics as they access, understand, and integrate climate information, products, and services into their decision-making. The measure is made via a combination of surveys and focus groups to establish a baseline measurement with biennial follow-up measurements to determine the percentage improvement in the QoR as climate services are increased and improved. In our last QoR measure, Climate.gov scored a 76.2 whereas our target was 75. In FY 2016, the team will implement Phase 3 site redesigns and developments based on user feedback and then we will conduct our next QoR evaluation in FY 2017 — with a target of 77. We will conduct our baseline QoR measure of the CRT in FY 2017.</p>							



**PROGRAM CHANGE PERSONNEL DETAIL**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Climate Research  
**Program Change:** NOAA Climate.gov Portal

<b>Title:</b>	<b>Location</b>	<b>Grade</b>	<b>Number of Positions</b>	<b>Annual Salary</b>	<b>Total Salaries</b>
Physical Scientist	Silver Spring, MD	ZP-IV	1	92,145	92,145
Subtotal			<u>1</u>		<u>\$92,145</u>
Less Lapse	25%		<u>0</u>		<u>(\$23,036)</u>
Total Full-time permanent:			1		\$69,109
2017 Pay Adjustment	1.6%				\$1,106
<b>TOTAL</b>			1		\$70,215
<b>Personnel Data</b>			<b>Number</b>		
Full-time Equivalent Employment					
Full-time permanent			1		
Other than full-time permanent			0		
<b>Total</b>			<u>1</u>		
Authorized Positions:					
Full-time permanent			1		
Other than full-time permanent			0		
<b>Total</b>			<u>1</u>		

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Climate Research  
**Program Change:** NOAA Climate.gov Portal

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$70	\$5,112
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	32
11.6	Leave Surcharge Full-Time	0	20
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>\$70</u>	<u>\$5,164</u>
12	Civilian personnel benefits	20	1,334
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	18	492
22	Transportation of things	0	15
23.1	Rental payments to GSA	0	174
23.2	Rental Payments to others	0	120
23.3	Communications, utilities and misc charges	0	85
24	Printing and reproduction	0	3
25.1	Advisory and assistance services	0	763
25.2	Other services	2,152	9,344
25.3	Purchases of goods & services from Gov't accounts	0	13,041
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	190
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	20	1,198
31	Equipment	20	130
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	8,513
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>2,300</u>	<u>40,566</u>

Due to financial system limitations, the object class detail for the Program reflects the Regional Climate Data and Information PPA.

**Regional Climate Data and Information: Assessments (Base Funding: \$4,330,000 and 0 FTE; Program Change +\$3,970,000 and 0 FTE):** NOAA requests an increase of \$3,970,000 and 0 FTE for a total of \$8,300,000 and 0 FTE to support a sustained capability to produce climate assessments at regional and national scales.

**Proposed Actions:**

The fourth National Climate Assessment is scheduled for delivery in the Spring of 2018. In addition to support for production and rollout of this Assessment, resources are requested to lay the groundwork for the fifth National Climate Assessment, which cannot be delivered in a sustained, robust form at the current resource level.

This proposed investment will ensure that NOAA supports a robust assessment process and delivers science-based, high-value climate information to support decisions for businesses, industry, and the American public. This will be accomplished by providing authoritative, relevant, accessible and useful assessments in a timely, sustained, and repeatable manner. Regular climate assessments are essential to ongoing efforts to understand what climate change means for the Nation and what services are necessary to allow for informed decision-making.

Requested funding will support:

- Science activities with existing interagency programs to develop the foundational scientific knowledge required for a sustained national climate assessment,
- Sustained engagement with the academic community and private sector in the Assessment process including contributing to authorship of the report,
- Expansion of an advanced interagency National Climate Indicator System beyond the 2015 pilot phase involving a greater portion of the academic community and private sector,
- Further development of scenarios (e.g. future climate, regions, sea level, land use, sectors), and
- Regional and sectoral research, including risk and vulnerability analyses, to address key science questions and stakeholder needs identified from the 2014 National Climate Assessment.

NOAA will also develop strategies to enhance collaboration between existing regional networks, within NOAA and with partners to better coordinate scientific research on climate impacts and vulnerabilities across the U.S. and analyze new model results through the international Coupled Model Intercomparison Project (CMIP) to inform regional assessments drawing from scientific excellence across the research community. In FY 2017, NOAA will analyze model performance in simulating regional climate variability and trends over North America, evaluate those efforts, and develop an understanding of how well regional climate processes are represented in CMIP models. The assessment community has a critical need for this information to inform assessments with solid scientific understanding.

NOAA will also continue to lead the Technical Support Unit, which provides critical capacity to produce the quadrennial Assessment and contributing reports, and further contribute to the interagency Global Change Information System. Investments in FY 2017 will build on work from prior years to support a data infrastructure system that will provide enhanced transparency and traceability for assessment data and conclusions. In addition, the U.S. Climate Resilience Toolkit ([toolkit.climate.gov](http://toolkit.climate.gov)) will integrate foundational scientific assessment information with decision-support tools across the government to help communities and businesses build resilience to climate-related impacts and extreme events.

**Statement of Need and Economic Benefit:**

The Global Change Research Act of 1990 (GCRA) calls for the President (through a Federal interagency body) to prepare and submit to the Congress, on a periodic basis (at least every four years), an assessment which: 1) integrates, evaluates, and interprets the findings of the Federal interagency research effort and discusses the scientific uncertainties associated with such findings; 2) analyzes the effects of global change on the natural environment, agriculture, energy production and use, land and water resources, transportation, human health and welfare, human social systems, and biological diversity; and 3) analyzes current trends in global change, both human-induced and natural, and projects major trends for the subsequent 25 to 100 years. NOAA took the lead Federal role in the 2014 National Climate Assessment and is leading the 2018 National Climate Assessment.

A sustained assessment process is called for in both the *National Global Change Research Plan: 2012-2021* (the strategic plan for the U.S. Global Change Research Program (USGCRP)) and *Preparing the Nation for Change: Building a Sustained National Climate Assessment Process* (the report of the Sustained Assessment Special Report (SASR) Workgroup of the NOAA-supported National Climate Assessment Development Advisory Committee (NCADAC)). This plan has the potential to build on current assessment activities across NOAA Line Offices to establish the standing capacity to provide periodic syntheses and assessment of foundational climate science, which can provide new scientific insights, identify knowledge gaps, serve as the basis for Federal policy, and provide a starting point for the development of tailored, contextualized information that is easy for stakeholders to use within their specific regional and sectoral decision contexts.

Regional and national assessments can meet an increasing range of demands for climate change decision support information across the Nation, critical for the public and many economic sectors to adequately plan for and adapt to changes in the Nation's climate. Building on the past two decades of experience, and pairing existing expertise with emerging capacity, NOAA will support a collaborative, participatory assessment process that engages scientists, government officials, businesses, and communities in the investigation of climate impacts and effective mitigation and adaptation. The 2014 assessments' rigor and transparency was unprecedented. This three-year-effort involved a team of over 300 climate scientists and experts, more than 70 technical workshops and stakeholder listening sessions across the country, and extensive review by the public and by scientific experts in and out of government. The requested resources will allow us to build upon this successful multi-agency approach to ensure a cost-effective, sustained assessment process.

Climate assessments will help synthesize both operational and research elements of NOAA, and build upon many existing NOAA resources and functions including research in the physical, biological, and social sciences, observing, data management, modeling and forecasting, education, and outreach. NOAA will also enhance its capabilities and tailor its products through partnerships with other Federal agencies, and the academic, public and private sectors.

**Resource Assessment:**

The resources for this activity are described in the Regional Climate Data and Information narrative.

**Schedule and Milestone Highlights:**

FY 2017 – 2019

- Deploy full climate indicator system through the Global Change Information System. Support assessment product development for topical/regional issues of high priority to NOAA and its partners. Improve and expand the Global Change Information System to make data and information more fully available to a broad range of users
- Fund new research to assess national and regional climate impacts and vulnerabilities and research to improve understanding of model performance in simulating climate processes that underlie projections, including the development of relevant model metrics
- Complete updates of existing regional and sectoral assessments
- Produce fourth National Climate Assessment and begin the fifth National Climate Assessment

**Deliverable Highlights:**

- Deploy the prototype version of the Global Change Information System, including pilot of climate indicator system
- Report on options for enhancing collaboration between existing regional programs, within NOAA and with partners, to better coordinate scientific research on climate impacts and vulnerabilities across the U.S.
- Deploy next generation climate indicator system through the Global Change Information System
- Produce reviewable draft of the National Climate Assessment and update assessment content online. A technical report and journal publications on process-level performance of climate models for use by the assessment process
- Sustained regional capability for contributing to assessments process

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Number of new metrics developed and applied to evaluate model projections for regional application by the assessments	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	1	4	7	11	14
<b>Without Increase</b>	N/A	N/A	0	0	0	0	0
<b>Description:</b> These metrics would yield information about the trustworthiness of models for particular applications to regional, sectoral, and physical impacts of climate change.							

<b>Performance Measure:</b> Number of new indicators included in the National Indicator System	<b>FY 2015 Target</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	6	6	6	6	6
<b>Without Increase</b>	10	0	2	2	2	2	2
<b>Description:</b> This performance measure will demonstrate the role of formal climate change assessments in decisions to address climate change impacts by identifying the number of topics addressed in the assessments that are considered by business, government, or the public that affected decisions related to improved climate resilience. Information topics are based on the U.S. Global Change Research Program report, "Global Climate Change Impacts in the U.S." This measure will track the extent to which the USGCRP topical information items are used by industry, etc., to inform their key decisions on how to mitigate or adapt to climate change.							

<b>Performance Measure:</b> Number of regional sustained assessment coordinators providing lasting capability.	<b>FY 2015 Target</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	4	4	4	4	4
<b>Without Increase</b>	0	0	0	0	0	0	0
<b>Description:</b> These assessment coordinators would be affiliated with the Regional Integrated Sciences and Assessments organizations NOAA's Climate Program Office sponsors. These individuals would provide a sustained link between the RISAs and the National assessment activity and indicators system development.							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Climate Research  
**Program Change:** Assessments

<b>Object Class</b>	<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$5,042
11.3 Other than full-time permanent	0	0
11.5 Other personnel compensation	0	32
11.6 Leave Surcharge Full-Time	0	20
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	<u>\$0</u>	<u>\$5,094</u>
12 Civilian personnel benefits	0	1,314
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	60	534
22 Transportation of things	0	15
23.1 Rental payments to GSA	0	174
23.2 Rental Payments to others	0	120
23.3 Communications, utilities and misc charges	0	85
24 Printing and reproduction	0	3
25.1 Advisory and assistance services	0	763
25.2 Other services	75	7,267
25.3 Purchases of goods & services from Gov't accounts	0	13,041
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	235	425
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	1,178
31 Equipment	0	110
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	3,600	12,113
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	<u>3,970</u>	<u>42,236</u>

Due to financial system limitations, the object class detail for the Program reflects the Regional Climate Data and Information PPA.

**Regional Climate Data and Information: NOAA Arctic Research Program: Arctic Observing Network (Base Funding: \$3,156,000 and 1 FTE; Program Change: \$4,255,000 and 1 FTE):** NOAA requests an increase of \$4,255,000 and 1 FTE for a total of \$7,411,000 and 2 FTE to support northward development of NOAA's Arctic Observing Network. This investment would dramatically improve NOAA's capability to predict and model seasonal sea ice coverage across the Arctic, particularly in Alaska to support stakeholder needs. It will also enable the development of observation-based Arctic informational products, including future scenarios of Arctic Ocean changes, such as sea-ice extent, ecosystem evolution, ocean acidification, and Arctic to mid-latitude weather/climate linkages.

**Proposed Actions:**

OAR will work with partners across NOAA, other Federal agencies, and the countries of the Arctic Council, plus those countries that participate in the Pacific Arctic Group (PAG), to develop sustain observing capabilities in the Pacific Arctic and beyond. Full ocean depth moorings, state-of-the-art autonomous vehicles and ice observing assets will be deployed to monitor changes in currents, fluxes of heat, freshwater, nutrients, ocean acidification and marine life. In addition, atmospheric observations of radiative properties and greenhouse gases will provide much needed information on the coupled ocean-ice-atmosphere, which is critical to predicting future changes in Arctic climate. These data products are vital to other NOAA missions, such as fisheries management, weather forecasting and navigational services. Outside of NOAA, the expanded products from the Arctic Research Program (ARP) would support the scientific and operational needs of the National Science Foundation, Office of Naval Research, The Bureau of Ocean Energy Management, and many other Federal, state and local agencies through the Interagency Arctic Research Policy Committee (IARPC). The activities outlined here are all critical components of the President's National Strategy for the Arctic Region (NSAR) Implementation Plan.

The proposed actions are to:

- (1) Fill in critical observation gaps in the warming Pacific Arctic with annual 40-day expeditions to the Chukchi Sea to include all lines in the Distributed Biological Observatory (DBO), which supports NOAA Arctic ecosystem research and National Marine Fisheries Services (NMFS) priorities. These observations are critical to understanding the impact that changing environmental conditions such as the loss of sea ice and ocean acidification are having on Arctic ecosystems, marine mammals and human populations. Activities and data sharing will occur through IARPC and PAG, as well as through Arctic Council Working Groups.
- (2) Eliminate critical data gaps, particularly during winter months by deploying fixed location moorings and unmanned autonomous vehicles to provide continuous collection of environmental intelligence across the Arctic.
- (3) Develop interactive, information-based products on ongoing observations as well as expanded ice-mass buoy network; Improve model forecasts and heat fluxes measurements, which are critical to the National Weather Service (NWS) in Alaska and beyond by expanding the ice tethered profiler network to collect critical under ice measurements for year-round environmental intelligence gathering.
- (4) Expand observation-based synthesis contributions to the ARP's annual Arctic Report Card to include maps of heat/greenhouse gas fluxes in the Arctic as well as improved sea ice modeling



outputs and graphics. The Arctic Report Card has become a seminal document for U.S. and internal Arctic policy consideration.

(5) Provide new data to support NOAA's contribution to the World Climate Research Program (WCRP) Polar Prediction Project.

(6) Further develop NOAA's contribution to the U.S. Arctic Observing Network (AON), and the Arctic Council's Sustaining Arctic Observing Network (SAON). NOAA will seek and strengthen collaborations with international partners on the Arctic Council as well as Korea, China, and Japan. NOAA will work with other Federal agencies through IARPC to create a fully integrated Arctic Observing Network that supports critical stakeholder needs such as commercial and subsistence activities in the Arctic.

The ARP has already engaged the Alaska Ocean Observing System (AOOS) to provide long-term data archiving and servicing for the Distributed Biological Observatory, the Russian-American Long-term Census of the Arctic (RUSALCA) program, and the newly developing products. If funded, data from the expanded network will be housed in this facility as well.

#### **Statement of Need and Economic Benefits:**

Over the last 12 years, the demand for sustained environmental intelligence in the Arctic has grown considerably as commercial development has expanded. Through direct investment, leveraging within NOAA, and interagency/international partnerships, the ARP has built some sustained Arctic observation capacity, including sea ice measurements, ship surveys of the ecosystems in the Chukchi Sea, and pan-Arctic atmospheric observing assets. Following a review of the program in 2013, and agreements with partner agencies and countries, the ARP is planning a strategic move during 2016-2020 northward in the Pacific Arctic, an area where rapid environmental change and commercial development are occurring at an unprecedented pace.

#### **Resource Assessment:**

Resources for this activity are described in the Regional Climate Data and Information narrative.

#### **Schedules and Milestone Highlights:**

FY 2017

- Coordinate with national and international partners, vessels of opportunity, science missions, logistics, and financial obligations to develop an updated framework for a sustained Arctic observing network
- Enhance data management and aggregation for the interagency Arctic Observing Network and summarize data already gathered to craft efficient work plans for future years

FY 2018

- Provide baseline data that will inform issues of Arctic change including future scenarios of Arctic Ocean heat flux changes, sea-ice extent, ecosystem evolution, Arctic to mid-latitude weather/climate linkages and human health

FY 2019

- Release an expanded Arctic Report Card that encapsulates new data from sustained assets and hold workshop to evaluate the status of the Arctic Observing Network

FY 2020

- Release first round of data synthesis products from expanded observing network

FY 2018 – 2021 (on-going)

- Carry out annual expeditions to the high Pacific Arctic with Japan, China, Canada, Korea, Russia and other Arctic Council countries to build and sustain the Pacific Arctic Climate Observing System
- Annually deploy the following for data collection: “next generation” of Arctic sea ice observing assets including ice mass buoys and ice-tethered profilers; subsurface and surface autonomous gliders along the ice edge and under the ice to map previously data-limited areas; continental shelf and deep water moorings to provide year-round measurements of physical and biological conditions and monitor change

**Deliverable Highlights:**

- Multiple observations of the Pacific Arctic through expanded cruises, autonomous vehicles, and ice observing assets
- Increased knowledge and characterization of critical processes determining Arctic Ocean mixing, sea-ice extent, ocean acidification, mid-latitude weather extremes, and marine ecosystems changes
- Additional and improved syntheses within the annual Arctic Report Card and improvements in the sea ice outlook annual report
- Model-data fusion workshops- both regional and northern hemisphere, to increase uptake of observational information within models and forecast systems
- Data service system integration and programming

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Increase the number of Arctic system products needed to clarify the causes and consequences of Pacific Water influx into the Arctic Ocean							
<b>With Increase</b>	N/A	N/A	20	17	15	15	15
<b>Without Increase</b>	10	10	10	10	10	10	10
<p><b>Description:</b> This performance measure describes the increase in the number of value-added products (based on observations) describing the changes in time of Pacific and Atlantic water fluxes in the Pacific sector of the Arctic Ocean region. Monitoring these fluxes is important to understand the variability of sea-ice extent and volume and the consequent physical and ecosystem changes occurring in the Arctic. These include data sets useful for mid-latitude modelers, data that can be assimilated into sea ice ecosystem models and information that will allow the community to create benchmark maps of marine life, currents, and fluxes in the changing Pacific Arctic Ocean. Data will be stored on the AOOS website and linked with the Arctic Council’s pan-Arctic monitoring programs.</p>							

<b>Performance Measure:</b> Cumulative increase in number of baseline ecosystem transects and sentinel stations (e.g., Distributed Biological Observatory)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	6	6	6	6	6
<b>Without Increase</b>	2	2	2	2	2	2	2
<b>Description:</b> This performance measure describes the increase in the number of transects/stations where standardized observations of marine ecosystems are recorded to monitor year-to-year variability.							

<b>Performance Measure:</b> Increase in number of new Observations data sets from the Pacific Arctic made available to NOAA (AOOS), the Pacific Arctic Group, and the Arctic Council working groups.	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	4	5	6	7	8
<b>Without Increase</b>	1	1	1	1	1	1	1
<b>Description:</b> This performance measure aims to show an ongoing increase in NOAA's contribution to carrying out its mission to deploy an Arctic Observing Network in key regions of the Pacific Arctic that are thought to be critical drivers of global change. These observations will be made available via the AOOS to the IARPC, to the Pacific Arctic Group, to the Arctic Council working groups and to the Sustaining Arctic Observing Network. The outcomes will strengthen informational links to stakeholders in the Arctic region.							

**PROGRAM CHANGE PERSONNEL DETAIL**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Climate Research  
**Program Change:** Arctic Observing Network

<b>Title:</b>	<b>Location</b>	<b>Grade</b>	<b>Number of Positions</b>	<b>Annual Salary</b>	<b>Total Salaries</b>
Physical Scientist	Silver Spring, MD	ZP-IV	1	92,145	92,145
	Seattle, WA	ZP-IV	1	90,284	90,284
Subtotal			<u>2</u>		<u>\$182,429</u>
Less Lapse	25%		<u>(1)</u>		<u>(\$45,607)</u>
Total Full-time permanent:			1		\$136,822
2017 Pay Adjustment	1.6%				\$2,189
<b>TOTAL</b>			1		\$139,011
<b>Personnel Data</b>			<b>Number</b>		
Full-time Equivalent Employment					
Full-time permanent			1		
Other than full-time permanent			0		
<b>Total</b>			<u>1</u>		
Authorized Positions:					
Full-time permanent			2		
Other than full-time permanent			0		
<b>Total</b>			<u>2</u>		

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Climate Research  
**Program Change:** Arctic Observing Network

<b>Object Class</b>	<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11 Personnel compensation		
11.1 Full-time permanent	\$139	\$5,181
11.3 Other than full-time permanent	0	0
11.5 Other personnel compensation	0	32
11.6 Leave Surcharge Full-Time	0	20
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	<u>\$139</u>	<u>\$5,233</u>
12 Civilian personnel benefits	34	1,348
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	100	574
22 Transportation of things	0	15
23.1 Rental payments to GSA	0	174
23.2 Rental Payments to others	0	120
23.3 Communications, utilities and misc charges	0	85
24 Printing and reproduction	0	3
25.1 Advisory and assistance services	0	763
25.2 Other services	300	7,492
25.3 Purchases of goods & services from Gov't accounts	400	13,441
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	190
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	1,178
31 Equipment	75	185
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	3,207	11,720
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	<u>4,255</u>	<u>42,521</u>

Due to financial system limitations, the object class detail for the Program reflects the Regional Climate Data and Information PPA.

**Regional Climate Data and Information: Regional Integrated Sciences and Assessments (Base Funding: \$5,872,000 and 2 FTE; Program Change: +\$3,912,000 and +1 FTE):**

NOAA requests an increase of \$3,912,000 and 1 FTE for a total of \$9,784,000 and 3 FTE to expand its capability for regional research and information services.

**Proposed Actions:**

Proposed funding will allow NOAA to increase its support of external research teams who collaborate with regional decision makers (such as water utilities, agricultural and coastal extension agents, and city and state planners) to develop information and inform decisions about extreme events, inland and coastal hazards, and their impact on communities, natural and managed resources, infrastructure, transportation, and health through the Regional Integrated Sciences and Assessments (RISA) program.

One new region would be competitively awarded adding to the current number of 10 regions. Priorities for this new competition would be focused on regional issues such as drought, flooding, storm surges, heat waves and longer term issues of sea level rise. Strengthening and initiating new partnerships with Federal entities such as U.S. Department of Agriculture (USDA), U.S. Department of the Interior (DOI), U.S. Environmental Protection Agency (EPA), and Federal Emergency Management Agency (FEMA) will be critical as well. Each RISA award will provide new research and build capacity for decision makers and regional, state, and local communities to prepare for and manage inland and coastal climate hazard risks in these regions. For example, a Mid-Atlantic RISA could help coastal communities prepare for and respond to coastal flooding from storms, such as Superstorm Sandy. A Midwest RISA could help farmers cope with the effects of drought and flooding in the Missouri River basin.

In addition to supporting a new region, these funds will expand the RISA program 's reach to new decision makers in existing regions with a focus on building the resilience of small cities, towns and rural communities not already served by RISA teams. Support will increase research and stakeholder engagement around emerging regional risks, such as the effects of extreme heat on human health and sea level rise on coastal infrastructure.

The program will also expand support for RISA teams to collaborate with other NOAA and external partners in each region. Such collaborative efforts have been critical in supporting regionally tailored decision-support tools. For example, a RISA-supported water reservoir visualization tool helps water managers and cattle ranchers in the southern U.S. plan for changes in reservoir water levels. Expanding support for existing regions will enable RISA teams to further evaluate of how decision makers use current products and information, improving the impact of regional research and engagement moving forward.

**Statement of Need and Economic Benefits:**

Every year, the impacts of extreme events on water availability, wildfire regimes, public health, agriculture, energy issues, and coastal communities become more acute while physical, biological and social sciences make great strides in producing knowledge that could aid decision makers dealing with these issues.

For example, crops and livestock alone are valued at \$77 billion for the Midwestern region of the U.S.<sup>4</sup>, and fisheries and tourism amount to over \$5 billion of value for the Chesapeake Bay region<sup>5</sup>. With the addition of RISAs, the agriculture, fisheries and tourism sectors, along with cities, towns and communities in new regions will gain valuable scientifically-based and regionally-specific information about droughts, floods, storm surges, and temperature changes. RISA scientists provide information that decision makers use to cope with drought, understand climatic influences on wildfire, and assess climate impacts on the transportation sector, coastal communities, and human health. Stakeholders use such information to evaluate potential risks to water supply and hydroelectric power, and support disaster management and city planning. RISAs are helping farmers, ranchers, and fishermen use climate information to produce the Nation's foods and materials. Stakeholders from regions that are not currently being served by the RISA program are asking for similar help in their regions.

### **Resource Assessment:**

Resources for this activity are described in the Regional Data and Information narrative.

### **Schedules and Milestone Highlights:**

FY 2017

- Solicit proposals for one new RISA region
- Solicit proposals to develop research products that will contribute to and deepen partnerships with regional information providers in the existing RISA regions and initiate engagement with at least one new community in an existing region

FY 2018

- Initiate 1-2 new research partnerships between RISA, regional NOAA information providers, and interagency partners (e.g. DOI, USDA)
- Initiate RISA engagement with at least two new communities in existing regions

FY 2019 – 2021

- Solicit 2<sup>nd</sup> round of proposals to develop research products that will contribute to and deepen partnerships with regional information providers in the existing RISA regions and initiate 1-2 new research partnerships between RISA, regional NOAA information providers, and interagency partners (e.g. DOI, USDA)

### **Deliverable Highlights:**

- Expand applied research support of local, state, and regional decision makers in up to three regions with new five-year cooperative agreement centers
- Develop or enhance research priorities for regional climate science and services in partnership with Federal or regional partners (e.g. the USDA and DOI)
- Expand applied research and engagement with local, state and regional decision makers to at least three new communities in existing regions

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<sup>4</sup> Hatfield, J., 2012: Agriculture in the Midwest. In: *U.S. National Climate Assessment Midwest Technical Input Report*. J. Winkler, J. Andresen, J. Hatfield, D. Bidwell, and D. Brown, coordinators. Available from the Great Lakes Integrated Sciences and Assessments (GLISA) Center, [http://glisa.msu.edu/docs/NCA/MTIT\\_Agriculture.pdf](http://glisa.msu.edu/docs/NCA/MTIT_Agriculture.pdf).

<sup>5</sup> *The Economic Importance of the Bay*. Retrieved from <http://www.cbf.org/how-we-save-the-bay/issues/cost-of-clean-water/economic-importance-of-the-bay>.

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Number of regionally and sectorally focused climate impacts and adaptation studies communicated to decision makers (per year)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	27	27	28	28	29
<b>Without Increase</b>	27	27	27	27	27	27	27
<b>Description:</b> Number of peer-reviewed publications and reports published and released annually. The publications/reports are developed through interaction with and/or are communicated to stakeholders. Publications and reports are collected from investigators conducting climate impacts and adaptation research in cooperation with stakeholders. The goal of this research is to better understand and enhance the use of NOAA products and information to meet user requirements for natural resource management information in various sectors (e.g. drought and water resources, fire risk, ecosystem and coastal impacts, sea-level rise, human health, agriculture, etc.)							

<b>Performance Measure:</b> Number of states or territories using new or tailored climate services (tools, information, technical assistance, or products) as a result of regional, state, and local interaction with decision makers (each year)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	7	9	9	10	11
<b>Without Increase</b>	5	5	7	7	8	9	9
<b>Description:</b> The number of products and services, including provided or existing products and services that are modified/expanded for new user groups or regions. 'Products and services' include technical assistance, training, and guidance documents to enable planning and decision making. (This measure is partially based on the current GPRA: Number of regionally and sectorally focused climate impacts and adaptation studies communicated to decision makers.)							



**PROGRAM CHANGE PERSONNEL DETAIL**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Climate Research  
**Program Change:** Regional Integrated Sciences and Assessments

<b>Title:</b>	<b>Location</b>	<b>Grade</b>	<b>of Positions</b>	<b>Salary</b>	<b>Salaries</b>
Physical Scientist	Silver Spring, MD	ZP-IV	1	92,145	92,145
Subtotal			<u>1</u>		<u>\$92,145</u>
Less Lapse	25%		<u>0</u>		<u>(\$23,036)</u>
Total Full-time permanent:			1		\$69,109
2017 Pay Adjustment	1.6%				\$1,106
<b>TOTAL</b>			1		\$70,215
<b><u>Personnel Data</u></b>			<b><u>Number</u></b>		
Full-time Equivalent Employment					
Full-time permanent			1		
Other than full-time permanent			0		
<b>Total</b>			<u>1</u>		
Authorized Positions:					
Full-time permanent			1		
Other than full-time permanent			0		
<b>Total</b>			<u>1</u>		

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Climate Research  
**Program Change:** Regional Integrated Sciences and Assessments

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$70	\$5,112
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	32
11.6	Leave Surcharge Full-Time	0	20
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>\$70</u>	<u>\$5,164</u>
12	Civilian personnel benefits	24	1,338
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	474
22	Transportation of things	0	15
23.1	Rental payments to GSA	0	174
23.2	Rental Payments to others	0	120
23.3	Communications, utilities and misc charges	0	85
24	Printing and reproduction	0	3
25.1	Advisory and assistance services	0	763
25.2	Other services	303	7,495
25.3	Purchases of goods & services from Gov't accounts	0	13,041
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	190
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	1,178
31	Equipment	0	110
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	3,515	12,028
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>3,912</u>	<u>42,178</u>

Due to financial system limitations, the object class detail for the Program reflects the Regional Climate Data and Information PPA.

**Climate Competitive Research: Impacts of Climate on Fish Stocks (Base Funding: \$2,100,000 and 0 FTE; Program Change: +\$5,830,000 and + 1 FTE):** NOAA requests an increase of \$5,830,000 and 1 FTE for a total of \$7,930,000 and 1 FTE to fund research to improve understanding of impacts of climate variability and change on fisheries.

**Proposed Actions:**

The proposed research investment improves understanding of the impacts of climate variability and change on fish stocks, prey availability, habitat, fisheries, and the communities and economies that depend on them.

A FY 2017 request for proposals (RFP) will build off of already funded research focused on the Northeast Shelf Large Marine Ecosystem. The competitive funding opportunity for this initial research was a collaborative effort between OAR and NOAA Fisheries. This increase will support similar research efforts to better understand, prepare for and respond to climate impacts on fish stocks and fisheries in other U.S. regions. A combination of smaller 2-3 year awards and larger 5-year interdisciplinary, multi-institution awards will be supported through the RFP. All proposals will be reviewed through a rigorous panel review process and selected to ensure strong alignment with the request for proposals.

This proposed research investment will lead to the development of valuable information, decision-support tools, and training to build capacity for integrating climate information into fisheries management. Enhancing early-warning and management of climate impacts of climate variability and change will help minimize economic disruption for the many communities, citizens, and livelihoods across the Nation that depend on healthy fisheries.

**Statement of Need and Economic Benefits:**

Healthy and productive fisheries are essential to the U.S. economy. In 2013, U.S. commercial fishing and seafood industry and recreational fishing generated \$195 billion in sales impacts, contributed \$89 billion to gross domestic product, and supported over 1.7 million full and part-time jobs in fishing and across the broader economy<sup>6</sup>. Sustainable fisheries create and sustain jobs, stabilize economies in coastal working waterfronts, provide opportunities for commerce, and help to meet the growing demand for seafood across the U.S. and the world.

This proposed action provides information on the impacts of climate variability and change on fish stocks and fisheries so that fisheries managers and stakeholders can reduce these impacts and increase resilience. Climate-related impacts can affect the abundance, distribution, and productivity of fish stocks. For example, the Northeast has been experiencing groundfish declines, likely in part due to recent changes in ocean conditions. During the first six months of 2012, sea surface temperature in the Northeast Shelf Large Marine Ecosystem were the highest ever recorded, and above-average temperatures were found from the ocean bottom to the surface across the region. These changes spurred an earlier and longer annual spring plankton bloom in the Gulf of Maine, and Atlantic cod continued to shift northeastward in distribution. These changes economically disrupt the fisheries and communities that depend on them. This

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<sup>6</sup> National Marine Fisheries Service. 2015. Fisheries Economics of the United States, 2013. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS-F/SPO-159, 240p.  
[http://www.st.nmfs.noaa.gov/economics/publications/feus/FEUS-2013/fisheries\\_economics\\_2013](http://www.st.nmfs.noaa.gov/economics/publications/feus/FEUS-2013/fisheries_economics_2013)

investment in research would inform sustainable management by providing critical advances in understanding and projection of climate-related impacts to the Nation's fisheries.

**Resources Assessment:**

This work will build off and leverage existing capabilities advanced through: NOAA's Competitive Climate Research line, NOAA's National Marine Fisheries Service including Fisheries Science Centers, Sea Grant, and research at NOAA Laboratories and Cooperative Institutes. In addition, this research would encourage new collaboration across Federal partners, such as the National Aeronautics and Space Administration and the Department of the Interior, that have capabilities and programs in climate and ecosystem science.

**Schedule and Milestone Highlights:**

FY 2017 – 2019

- Continue support for existing research awarded under the initial funding opportunity
- Support the implementation of new 3-year projects to address the impacts of climate on fish stocks, fisheries and the communities that depend on them

FY 2017 – 2021

- Support the implementation of new 5-year projects to build understanding, institutional capacity, and management of the impacts of climate variability and change on fish stocks and fisheries
- Conduct climate vulnerability assessments for commercially and recreationally important fish species

**Deliverable Highlights:**

- Development of research and services based on assessments of the climate products and services needed by marine resource managers and constituencies
- Integration, synthesis, and analysis of existing climate and ecological (e.g. fish abundance, distribution) observational and monitoring data
- Development and advancement of coupled climate-ocean-ecosystem models to foster understanding and projection of climate impacts on fish stocks
- Innovative research to determine the impacts of extreme events, climate variability, and climate change on fish, their prey, and habitat
- State-of-the-art, user-friendly, science-based tools (including trainings, guidebooks, websites, etc.) to support ongoing decision-making to prepare for, manage, and respond to climate risks on fish and fisheries

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Number of marine resource managers in Federal (NMFS), state (state agencies) and tribal government agencies integrating climate data and information to improve decision-making in the face of a changing climate	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	15	30	90	150	210
<b>Without Increase</b>	0	0	15	30	30	60	90
<b>Description:</b> Number of marine resource managers who have access to and use climate information to inform fisheries stock assessments, management plans, and practices. This includes participation in capacity-building and training activities.							

<b>Performance Measure:</b> Number of regional-scale projections and assessments to inform fisheries planning and management.	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	1	1	3	5	7
<b>Without Increase</b>	0	0	1	1	1.5	3	5
<b>Description:</b> Regional-scale projections and assessments will contribute to improved understanding of current and future climate (e.g. changes in temperature, pH) and ecosystem (e.g. changes in prey availability, habitat) conditions and associated consequences for marine fisheries. Knowledge gained through these efforts will inform planning and management.							

<b>Performance Measure:</b> Cumulative number of science-based adaptation tools and technologies that are used by NOAA partners and stakeholders to improve ecosystem-based management of fisheries.	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	0	3	7	10	15
<b>Without Increase</b>	N/A	0	0	3	3	7	10
<b>Description:</b> This measure tracks success in translating research findings into adaptation tools and technologies used by fisheries management community. The use of these products will improve sustainable management to enhance ecological and economic resilience in the face of change.							

**PROGRAM CHANGE PERSONNEL DETAIL**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Climate Research  
**Program Change:** Impacts of Climate on Fish Stocks

<b>Title:</b>	<b>Location</b>	<b>Grade</b>	<b>Number of Positions</b>	<b>Annual Salary</b>	<b>Total Salaries</b>
Physical Scientist	Silver Spring, MD	ZP-IV	1	92,145	92,145
Subtotal			<u>1</u>		<u>\$92,145</u>
Less Lapse	25%		<u>0</u>		<u>(\$23,036)</u>
Total Full-time permanent:			1		\$69,109
2017 Pay Adjustment	1.6%				\$1,106
<b>TOTAL</b>			1		\$70,215
<b>Personnel Data</b>			<b>Number</b>		
Full-time Equivalent Employment					
Full-time permanent			1		
Other than full-time permanent			0		
<b>Total</b>			<u>1</u>		
Authorized Positions:					
Full-time permanent			1		
Other than full-time permanent			0		
<b>Total</b>			<u>1</u>		

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Climate Research  
**Program Change:** Impacts of Climate of Fish Stocks

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$70	\$9,000
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	677
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	\$70	\$9,677
12	Civilian personnel benefits	24	5,747
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	8	937
22	Transportation of things	0	307
23.1	Rental payments to GSA	0	1,031
23.2	Rental Payments to others	0	232
23.3	Communications, utilities and misc charges	0	69
24	Printing and reproduction	0	3
25.1	Advisory and assistance services	0	763
25.2	Other services	0	2,928
25.3	Purchases of goods & services from Gov't accounts	0	3,732
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	120
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	10	1,178
31	Equipment	0	141
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	5,718	39,385
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	5,830	66,250

Due to financial system limitations, the object class detail for the Program reflects the Climate Competitive Research PPA

**APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES**  
**SUB-PROGRAM: WEATHER AND AIR CHEMISTRY RESEARCH**

The Weather and Air Chemistry Research sub-program continually improves capabilities to provide more accurate and timely warnings and forecasts of various high-impact weather, water, and air quality events.

The Weather and Air Chemistry Research sub-program support:

- research and development that provides the Nation with accurate and timely warnings and forecasts of high-impact weather events and their broader impact on issues of societal concern such as weather and air quality; and
- research that provides the scientific basis for informed management decisions about weather, water, and air quality.

Researchers at OAR Laboratories, Cooperative Institutes, and the Office of Weather and Air Quality have been key contributors to advancing the National Weather Service (NWS) by providing research to better understand severe weather events and through technological advancements in weather modeling, computing and observing.

The following Programs, Projects and Activities (PPA) are included in the Weather and Air Chemistry Research Subprogram: Weather and Air Chemistry Research Laboratories and Cooperative Institutes and Weather and Air Chemistry Research Programs.

**LABORATORIES AND COOPERATIVE INSTITUTES**

The OAR laboratories funded under this PPA include:

**Atlantic Oceanographic and Meteorological Laboratory (AOML)**

AOML improves seasonal forecasts of tornados and other severe weather events influenced by climate, including the prediction of hurricane track and intensity and the ocean's role in extreme weather events.

**National Severe Storms Laboratory (NSSL)**

NSSL improves the accuracy and timeliness of forecasts and warnings of hazardous weather such as tornadoes, flash floods, and winter weather, by developing techniques, computer models, and applications

**Physical Sciences Division (PSD)/ESRL**

PSD provides NOAA's core capability to conduct water cycle and weather physics research with an emphasis on extreme events in the Earth system that lead to floods, droughts, and heat waves.

**Chemical Sciences Division (CSD)/ESRL**

CSD conducts research to understand and quantify chemical gaseous and aerosol pollution emissions, their precursors, and the processes responsible for their transport and transformation in the atmosphere.



### **Global Monitoring Division (GMD)/ESRL**

Small changes in water vapor abundance strongly impact climate and provide critical input to climate models. GMD produces unique, long term records of these changes from year-to-year changes and as longer term trends.

### **Global Systems Division (GSD)/ESRL**

GSD develops next-generation weather models at global and storm scales, advances new technologies to run the models, and enhances the forecast to provide faster and more comprehensive weather information.

### **Air Resources Laboratory (ARL)**

ARL improves the characterization and prediction of plumes of airborne hazardous materials to address issues, like acid rain, air quality, and mercury contamination.

### **Geophysical Fluid Dynamics Laboratory (GFDL)**

GFDL improves numerical weather prediction models through long lead-time research on weather's predictability on both large and small scales. Modeling activities improve understanding of atmospheric circulations, with an emphasis on extreme weather events.

### **Office of Weather and Air Quality (OWAQ)**

OWAQ improves weather forecast information and products that support high-impact weather and air quality research, including studies of hurricanes, severe storms, air quality, and the social science associated with how the public reacts to weather forecasts.

### **Pacific Marine Environmental Laboratory (PMEL)**

PMEL provides technologies and tools to improve tsunami detection and warning capabilities, including improved tsunami-measurement buoys and model-based capabilities

### **Unmanned Aircraft Systems (UAS) Program**

Targeted observations from aircraft in oceanic regions could significantly improve how well weather models forecast significant events such as tropical storms, winter storms, and major floods. The UAS Program prototypes data collection for both observing and predicting high impact weather, including testing small UAS to improve flood warnings.

### **Schedule and Milestone Highlights:**

FY 2017 – 2021

- Install domestic and international Science On a Sphere systems for educational exhibits in science museums and other venues for a cumulative total of 185 systems
- Assess of the feasibility of operational use of gap filling radars to augment legacy observing systems (e.g. NEXRAD) in the west to provide better precipitation and water supply information

FY 2017

- Test impact of assimilation of satellite microwave radiance data using OSSE and OSE approaches using the operational HWRF and hybrid data assimilation system to improve hurricane intensity guidance

FY 2018

- Implement probabilistic products in flash flood forecasting system
- Transfer to operations the advanced multi-sensor dual-polarization radar QPE techniques for cool season precipitation

FY 2020 and Beyond

- Transfer to operations the MRMS space-borne and ground radar merged QPE

**Deliverable Highlights:**

- Regional mercury assessments for sensitive ecosystems
- A total of 100,000 stations feeding observations data to the Meteorological Assimilation Data Ingest System (MADIS)
- Tsunami observation, mitigation, and forecast tools
- High-quality hurricane observations from airborne (manned and unmanned) experiments for use in hurricane regional model data assimilation and evaluation
- Improved skill and reliability of flood and water supply forecasts

**Performance Goals and Measurement Data:**

***Hurricane Research***

<b>Performance Measure:</b> Reduce uncertainty of hurricane processes from airborne experiments (cumulative)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	11%	13%	15%	17%	19%	20%	21%

**Description:** Data collected in and about the hurricane environment from manned and unmanned hurricane research flights during the annual field program is invaluable to increasing knowledge of how hurricanes develop, move, and intensify. As a result of research and publications based on these observations, there will be increased knowledge that will be incorporated by the hurricane modeling community, resulting in increased accuracy in hurricane models. This observation program serves as the foundation for meeting NOAA's Weather-Ready Nation goal of reducing forecast uncertainty and unnecessary evacuations that result in economic impacts to communities.

<b>Performance Measure:</b> Reduced error in the prediction of hurricane track and intensity provided by the Hurricane Weather Research and Forecast (HWRF) model system	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	32%	37%	42%	47%	52%	57%	60%

**Description:** As a result of new hurricane observing systems, improved nesting capability, and advanced physics packages applicable at 1-km horizontal resolution, hurricane track and intensity forecasts using the operational hurricane prediction system will see a reduction in forecast error. Incorporating this improved hurricane data directly addresses NOAA's Weather-Ready Nation goal of reducing forecast uncertainty and unnecessary evacuations that result in economic impacts to communities.

### Severe Storms Research

<b>Performance Measure:</b> Expand cumulative number of severe weather events for which Warn-on-Forecast numerical predictions of tornado lead time exceeds 20 minutes	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	4	6	7	8	9	10	11
<b>Description:</b> The Warn-on-Forecast program is working to combine high resolution models with high resolution data (from radars and other observations), advanced data assimilation and quality control techniques, and high-end computing to produce a forecast of a tornado that would effectively extend tornado warning lead times well beyond the current national average of 13 minutes. NSSL conducts research that leads to improved warning skill scores (higher probability of detection, increased lead times, and reduced false alarms) through the Hazardous Weather Testbed experiments.							

<b>Performance Measure:</b> Continue improvement of flash flood warning skill scores of a prototype national flash flood guidance tool	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	0.25	0.27	0.29	0.31	0.33	0.35	0.36
<b>Description:</b> This performance measure shows the improvement of the Critical Success Index (CSI) skill score (higher CSI scores show a combined higher probability of detection and reduced number of false alarms) of the prototype flash flood guidance tool compared to the operational flash flood guidance during a demonstration and evaluation in the Hazardous Weather Testbed. Improved flash flood guidance will result in more precise and timely Flash Flood warnings and benefit the public.							

### Air Chemistry Research

<b>Performance Measure:</b> Increase cumulative number of regional assessments of atmospheric mercury source-receptor relationships	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	2	3	3	4	4	5	5
<b>Description:</b> This provides key information for air quality and environmental policy-makers and managers and for negotiators for international agreements—enabling them to make informed decisions concerning the control of mercury emissions.							

<b>Performance Measure:</b> Expand cumulative number of dispersion and air quality prediction system updates made available to NWS	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	6	7	8	9	10	11	12
<b>Description:</b> The updates of dispersion and air quality modeling systems, made available to NWS for operational use, will contribute to improved outcomes by improving the accuracy and usefulness of NWS dispersion and air quality prediction products. The updates also improve the ease of use and flexibility of the software for meeting NWS needs. NWS uses these modeling systems, such as HYSPLIT, for dispersion and air quality predictions for applications ranging from local chemical releases to international radiological incidents to smoke predictions, providing information to customers ranging from local emergency managers to the World Meteorological Organization to state air quality agencies.							

#### ***Weather Models and Advanced Technologies***

<b>Performance Measure:</b> Cumulative percent improvement in accuracy of the 3-hour cloud ceiling for aviation operational forecasts	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	7%	8%	9%	10%	10%	10%	11%
<b>Description:</b> Better awareness of expected cloud ceiling over the next 3-hour period is critical to airline safety and aircraft take-offs and landings. Cumulative percentage improvements (approx. 1% per year) are derived from operational implementation of new short-range, rapidly updated models called the Rapid Refresh and High Resolution Rapid Refresh at the NWS/National Centers for Environmental Prediction.							

#### ***Unmanned Aircraft Systems***

<b>Performance Measure:</b> Percentage of improvements in numerical weather forecasts due to observations obtained from Global Hawk Unmanned Aerial System	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	2%	2%	2%	2%	2%	2%	2%
<b>Description:</b> This work will test the hypothesis that a high altitude, long range, and long endurance UAS will provide unique high spatial and temporal resolution information capable of improving weather prediction skill by 2% or more for high impact weather events.							

**Wind Boundary Layer Research**

<b>Performance Measure:</b> Increase cumulative improvement in accuracy of forecasted wind speed and direction and accuracy of forecasted timing, amplitude, and duration of wind-ramp events (in testbed regions)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	3%	4%	5%	6%	7%	8%	9%
<b>Description:</b> The skill of a forecast is measured by the error, by the root mean square error (RMSE). The RMSE is a standard term in statistics that measures the differences between values predicted by a model and the values actually observed.							

## **WEATHER & AIR CHEMISTRY RESEARCH PROGRAMS**

Research Programs encourage cooperation with external experts in weather and air chemistry research. Currently two primary research programs are supported under this line.

### **U.S. Weather Research Program (USWRP)**

USWRP improves predictions and warnings for the public and weather sensitive U.S. industries by facilitating cutting-edge research. This research includes numerical weather modeling, analysis techniques, and observing platforms, such as airborne phased array radar (APAR). USWRP facilitates the transition of this research to provide more accurate and reliable weather forecasts and warnings.

### **Tornado Severe Storm Research/Phased Array Radar**

In an on-going collaboration between NOAA and the Federal Aviation Administration (FAA), the Multi-function Phased-Array Radar (MPAR) project is working to demonstrate the potential to simultaneously perform aircraft tracking, wind profiling, and weather surveillance with single phased array weather radar.

MPAR has the potential to significantly extend lead times for detecting tornadoes and other forms of severe and hazardous weather. With current technology, including Next Generation Weather Radar (NEXRAD) dual polarization, NOAA will be able to increase tornado warning lead times by approximately two minutes from the current 13 minutes over the next five years. NOAA does not anticipate the NEXRAD array to independently support tornado lead times of 20 minutes. With MPAR, tornado lead times could be increased to over 20 minutes. Electronically steered beams and faster scan rates can reduce the time it takes to make a complete Doppler radar observation from 4.5 minutes to less than one minute. Radar scans every minute will make severe weather easier to confirm, making warnings more accurate and reducing false alarms. Additionally, with improvements and development of new forecast and warning techniques and applications (such as warn-on-forecast) tornado warning lead times could be increased even more.

MPAR is considered a high-risk; high pay-back alternative. If MPAR is successful and implemented as a replacement radar, estimated multi-agency savings could total \$4.8 billion in acquisition costs (\$1.8 billion if replacing all existing radars with similar technology) and life cycle cost savings over 30 years (\$3.0 billion due to fewer radars).<sup>7</sup>

The MPAR project is jointly funded by NOAA and the FAA with all activities coordinated. NOAA is also developing an MPAR Advanced Technology Demonstrator, which bring the dual polarization technology and multi-function capability into an operating radar system to demonstrate the full capabilities of an MPAR system before the currently scheduled FAA Final Investment Decision (the Go / No-Go decision in FY 2021).

### **Schedule and Milestone Highlights:**

FY 2017 – 2021

- Complete annual competitive grant process to select USWRP-funded and demonstration projects

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<sup>7</sup> OFCM, 2006: Federal Research and development needs and priorities for phased array radar. Rep. FMC-R25-2006, Interdepartmental Committee for Meteorological Services and Supporting Research, Committee for Cooperative Research Joint Action Group for Phased Array Radar Project, 62 pp. [Available online at [www.ofcm.gov/r25-mpar/fcm-r25.htm](http://www.ofcm.gov/r25-mpar/fcm-r25.htm)]

- Evaluate readiness of USWRP-supported research to be transitioned into operations
- Research and develop activities identified in FY 2016 evaluation process to improve 3-4 week weather outlooks
- Demonstrate MPAR Advanced Technology Demonstrator
- Review of industry proposals for MPAR pre-production contract award
- Prepare recommendation for NOAA’s participation in FAA’s Final Investment Decision

**Deliverable Highlights:**

- Improved tornado warning decision performance produced in collaboration with NWS forecasters within the NOAA hazardous weather testbed (HWT)
- Prototype phased array radar products available for transfer into NOAA operations
- Transition of critical technologies, model improvements, and service applications to NOAA’s operational entities
- Test/evaluation of dual-polarization panel characteristics and performance

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Annual number of research and development results that are transferred into operations through weather-related testbed evaluations that will lead to improved weather forecasts and warnings	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	12	10	10	10	10	10	10
<b>Description:</b> Evaluation of new scientific findings or development of forecaster tools for potential use in operations that will lead to improved weather forecasts and warnings. The evaluation of research that is targeted for transfer into operations also is informed by the socioeconomic research that is funded within USWRP. Annually, university and Federal scientists receive competitive funding to conduct research that will improve forecasts and warnings of high-impact weather, including tornados and hurricanes. In collaboration with NOAA scientists, the knowledge and tools obtained from these studies are tested and transitioned into NOAA forecast operations.							

<b>Performance Measure:</b> Percent of projects that demonstrate increased technical readiness	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	N/A	30%	50%	70%	70%	70%	90%
<b>Description:</b> This measure tracks the proportion of transition projects that have increased the maturity of a technology by at least one degree of technical readiness (e.g., from TRL 4 to 5) over the course of a year. The total number of transition projects is the number of current projects at TRL 4 and above. The movements of TRLs at this state serve as an important indicator for projects maturing ultimately towards transition into operations.							

**PROGRAM CHANGES FY 2017:**

**Weather and Air Chemistry Laboratories and Cooperative Institutes: Vortex-Southeast (Base Funding: \$5,000,000 and 0 FTE; Program Change: -\$5,000,000 and 0 FTE):** NOAA requests a decrease of \$5,000,000 and 0 FTE for a total of \$0 and 0 FTE.

**Proposed Actions:**

NOAA is using congressionally directed funding as indicated in the Consolidated and Further Continuing Appropriations Act, FY 2016 to initiate this project to understand how environmental factors that are characteristic of the southeastern United States affect the formation, intensity, and storm path of tornadoes for this region. In FY 2017, NOAA proposes to eliminate this project to fully fund other priority programs.

**Resource Assessment:**

In FY 2016, NOAA laboratories are working in partnership with the National Weather Service, the National Science Foundation, and various academic partners, using the \$5,000,000, to observe key factors driving tornadoes in the Southeastern United States.

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Number of studies completed annually in the South East to improve tornado forecasts							
<b>With decrease</b>	N/A	N/A	0	0	0	0	0
<b>Without decrease</b>	N/A	3	10	10	10	10	10
<b>Description:</b> Funding goes to a consortium of universities and state agencies in the South East that are coordinated through National Severe Storms Laboratory and Oklahoma University. The consortium enables the universities to collaborate and exploit existing expertise within the academic and state agencies. Field studies will be used to improve tornado forecasts and help meteorologists disseminate information more effectively to the public.							



**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Weather and Air Chemistry Research  
**Program Change:** Vortex-Southeast

<b>Object Class</b>		<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$31,358
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	82
11.9	Total personnel compensation	<u>\$0</u>	<u>\$31,440</u>
12	Civilian personnel benefits	0	8,405
13	Benefits for former personnel	0	407
21	Travel and transportation of persons	(215)	1,306
22	Transportation of things	(100)	356
23.1	Rental payments to GSA	0	1,456
23.2	Rental Payments to others	0	4,235
23.3	Communications, utilities and misc charges	0	983
24	Printing and reproduction	0	294
25.1	Advisory and assistance services	0	1,165
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	350
25.5	Research and development contracts	(500)	2,545
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	1,650
31	Equipment	(1,000)	3,125
32	Lands and structures	0	3
33	Investments and loans	0	0
41	Grants, subsidies and contributions	(3,185)	17,829
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>(5,000)</u>	<u>75,549</u>

Due to financial system limitations, the object class detail for the Program reflects the Weather and Air Chemistry Research Laboratories and Cooperative Institutes PPA.

**Weather and Air Chemistry Laboratories and Cooperative Institutes: Base Research**  
**(Base Funding: \$80,549,000 and 218 FTE; Program Change: -\$2,896,000 and 0 FTE):**

NOAA requests a decrease of \$2,896,000 and 0 FTE for a total of \$77,653,000 and 218 FTE to decrease Cooperative Institute (CI) support for planned research projects in FY 2017. NOAA will narrow the focus of funding for research, broadly spread across its Cooperative Institutes partners, to particular key areas in FY 2017 such as:

- Developing near-term, affordable, and attainable advances in observational, computing, and modeling capabilities;
- Delivering substantial improvements in weather forecasting for the protection of life and property; and
- Accelerating the transition of its research to operations in ways easily adopted by the operational forecasting community.

NOAA will continue its traditional relationships with CIs in accomplishing the above objectives. NOAA research labs will continue to involve CI researchers using base resources. NOAA will make awards to CI's where they can make significant advances through such partnerships.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Weather and Air Chemistry Research  
**Program Change:** Base Research

<b>Object Class</b>	<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$31,358
11.3 Other than full-time permanent	0	0
11.5 Other personnel compensation	0	0
11.6 Leave Surcharge Full-Time	0	0
11.8 Special personnel services payments	0	82
11.9 Total personnel compensation	\$0	\$31,440
12 Civilian personnel benefits	0	8,405
13 Benefits for former personnel	0	407
21 Travel and transportation of persons	(297)	1,224
22 Transportation of things	(25)	431
23.1 Rental payments to GSA	0	1,456
23.2 Rental Payments to others	0	4,235
23.3 Communications, utilities and misc charges	0	983
24 Printing and reproduction	0	294
25.1 Advisory and assistance services	0	1,165
25.2 Other services	0	0
25.3 Purchases of goods & services from Gov't accounts	0	0
25.4 Operation and maintenance of facilities	0	350
25.5 Research and development contracts	(500)	2,545
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	(102)	1,548
31 Equipment	0	4,125
32 Lands and structures	0	3
33 Investments and loans	0	0
41 Grants, subsidies and contributions	(1,972)	19,042
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	(2,896)	77,653

Due to financial system limitations, the object class detail for the Program reflects the Weather and Air Chemistry Research Laboratories and Cooperative Institutes PPA.

**U.S. Weather Research Program: Improving the Airborne Detection and Understanding of Severe Weather (Base Funding: \$0 and 0 FTE; Program Change: +\$4,642,000 and +1 FTE):** NOAA requests an increase of \$4,642,000 and 1 FTE for a total of \$4,642,000 and 1 FTE to conduct research and development on improving the detection and understanding of severe weather with a new airborne phased array radar (APAR) and other airborne measurements.

**Proposed Actions:**

The proposed investment will enable research and development of advanced methods of aircraft-based hazardous weather observation, which provide critical information about severe, tropical and heavy precipitation storms, for more accurate public warnings and forecasts.

Airborne Doppler radar measurements provide critical location and intensity information about these storms, especially over open ocean or rugged terrain, where other radar information does not exist. Forecasters around the world utilize these radar observations, combined with satellite data and other environmental observations, to study storms and generate predictions of storm intensity and direction. However, NOAA cannot fully take advantage of current technology due to mounting restrictions on aircrafts. Therefore, this proposed investment will initially focus on the research and development of an airborne radar system which can be utilized on a NOAA aircraft, and will provide more data, more accurately.

Requested funding will be used to examine the potential benefits of APAR for providing the real-time data needed for National Weather Service (NWS) forecasts and warnings and to determine how APAR's additional, advanced capabilities can improve forecasts in the future. OAR will work with the research community to initially develop and demonstrate APAR's feasibility for collecting airborne radar measurements in hazardous weather environments, including hurricanes and severe local storms. Additionally, NOAA and its partners will use these measurements to conduct research to understand severe storms and improve NOAA's predictions and warnings for the public. Through this effort, future opportunities to develop and test other airborne observing systems, besides radar, will emerge and ensure that NOAA has the best airborne observing platform for hazardous weather events.

**Statement of Need and Economic Benefits:**

While NOAA's current generation of airborne radars continues to provide valuable storm information, advancements in radar technology development have demonstrated significant improvements in weather detection. Specifically, radar research related to severe thunderstorm detection has shown that far more storm details with faster updates from within severe storms can be obtained from the use of dual-polarization phased array radar. While these studies have focused on ground-based radars, other research has suggested that an APAR is a feasible<sup>8</sup> alternative for airborne applications. Such radar would double the amount of detail that can be gathered along the plane's flight path, with greatly reduced signal loss in heavy precipitation. Because of dual-polarization capability, APAR technology has the ability to distinguish raindrops, ice crystals, and snowflakes from each other, helping improve observations and predictions of dangerous heavy rain and snow events. In addition to the significant improvements in detection, phased array radars use flat plates to send and receive signals, making them very adaptable for attaching to the body of an aircraft. This is an important aspect

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<sup>8</sup> Vivekanandan, J., W.-C. Lee, E. Loew, J.L. Salazar, V. Grubisic, J. Moore, and P. Tsai, 2014: The Next Generation Airborne Polarimetric Doppler Weather Radar, *Geosci. Instrum. Method. Data Syst.*, 3, 1-16.

of this radar design for aircraft used for weather observations since approximately 90 percent of the current fleet used for tropical storm reconnaissance (C-130s) cannot house a radar system in the tail of the aircraft as is currently done in NOAA's WP-3D aircraft and its G-IV research aircraft. Additional storm information from more reconnaissance flights would improve NOAA's forecasts and warnings of these storms.

NOAA relies heavily on aircraft to observe hazardous weather, including hurricanes and severe local storms, particularly over the open ocean. While the data provided by airborne Doppler radar has been shown to be very important in improving the understanding of severe weather and improving the prediction of hurricanes<sup>9</sup>, 90 percent of the fleet that the U.S. uses to observe tropical storms and hurricanes over the open ocean, does not have radar onboard. Additionally, the tail Doppler radars that are currently installed on NOAA's fleet do not observe as much information about storms as is possible with today's radar technologies. Increase in understanding of storm behavior will lead to improved prediction of location and intensity of tropical storms and hurricanes when they make landfall. Such improved predictions will save money spent on unnecessary coastal evacuations, which can exceed millions of dollars per storm. In addition, APAR technology is expected to improve understanding of severe storm situations similar to the derecho that impacted the Ohio Valley and mid-Atlantic region in July 2014 and the devastating flash flooding event in Boulder County, Colorado in September 2014. This understanding will lead to improvements in the computer models used to predict these severe storm events.

#### **Resources Assessment:**

This is a new investment. NOAA does not have any resources dedicated to the development of new airborne observing systems.

#### **Schedule and Milestone Highlights:**

FY 2017

- Begin observing system simulation experiments (OSSEs) to evaluate impact of APAR spatial and temporal scanning strategies to guide development and evaluation

FY 2018

- Begin testing of an APAR prototype

FY 2019

- Complete OSSEs

FY 2020

- Conduct observational case studies of hurricanes, and, if feasible, other severe storm environments to investigate the importance of sampling time and dual-polarization impact

FY 2021

- Begin to evaluate potential of APAR technology to be transitioned into operations by the mid to late 2020's

#### **Deliverable Highlights:**

- Prototype products available for transfer into NOAA operations
- Test/evaluation of APAR characteristics and performance

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<sup>9</sup> Zhang, F., Y. Weng, J. F. Gamache, and F. D. Marks, 2011: Performance of convection-permitting hurricane initialization and prediction during 2008–2010 with ensemble data assimilation of inner-core airborne Doppler radar observations, *Geophys. Res. Lett.*, **38**, L15810, doi: <http://dx.doi.org/10.1029/2011GL048469>

- Test/evaluation of APAR dual-polarization antenna characteristics and performance
- Studies completed to assess APAR antenna array configurations for hazardous weather studies and operational implementation
- Transition of critical technologies, model improvements, and service applications to NOAA's operational entities

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Expand number of observing platforms evaluated in a year.							
<b>With Increase</b>	N/A	N/A	2	3	4	4	4
<b>Without Increase</b>	N/A	1	1	2	3	3	3

**PROGRAM CHANGE PERSONNEL DETAIL**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Weather and Air Chemistry Research  
**Program Change:** Improving the Airborne Detection and Understanding of Severe Weather

<b>Title:</b>	<b>Location</b>	<b>Grade</b>	<b>Number of Positions</b>	<b>Annual Salary</b>	<b>Total Salaries</b>
Physical Scientist	Silver Spring, MD	ZP-IV	1	92,145	92,145
Subtotal			<u>1</u>		<u>\$92,145</u>
Less Lapse	25%		<u>0</u>		<u>(\$23,036)</u>
Total Full-time permanent:			1		\$69,109
2016 Pay Adjustment	1.6%				\$1,106
<b>TOTAL</b>			1		\$70,215
<b>Personnel Data</b>			<b>Number</b>		
Full-time Equivalent Employment					
Full-time permanent			1		
Other than full-time permanent			0		
<b>Total</b>			<u>1</u>		
Authorized Positions:					
Full-time permanent			1		
Other than full-time permanent			0		
<b>Total</b>			<u>1</u>		

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Weather and Air Chemistry Research  
**Program Change:** Improving the Airborne Detection and Understanding of Severe Weather

<b>Object Class</b>		<b>FY 2017 increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	70	596
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>\$70</u>	<u>\$596</u>
12	Civilian personnel benefits	18	174
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	38	56
22	Transportation of things	40	42
23.1	Rental payments to GSA	0	13
23.2	Rental Payments to others	0	28
23.3	Communications, utilities and misc charges	0	29
24	Printing and reproduction	0	2
25.1	Advisory and assistance services	0	178
25.2	Other services	4,426	4,817
25.3	Purchases of goods & services from Gov't accounts	0	420
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	638
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	32
31	Equipment	50	135
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	5,538
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>4,642</u>	<u>12,698</u>

Due to financial system limitations, the object class detail for the Program reflects the U.S. Weather Research Program PPA.



**U.S. Weather Research Program: Research to Improve Mid-Range Weather Outlooks (Base Funding: \$0 and 0 FTE; Program Change: +\$3,936,000 and + 0 FTE):** NOAA

requests an increase of \$3,936,000 and 0 FTE for a total of \$3,936,000 and 0 FTE to expand research and development to improve the accuracy of NOAA's next-generation global coupled model out through weeks 3 and 4 (mid-range). This builds on the FY 2015 National Weather Service (NWS) initiative for improving mid-range weather outlooks to provide the necessary research that will ultimately allow for 30 day weather and water outlooks and longer lead severe storm outlooks.

**Proposed Actions:**

The FY 2017 request proposes to extend weather outlooks beyond current limits; initial actions will focus on weeks 3 and 4. Addressing this challenge requires a sustained scientific research and research-to-operations effort. This effort includes designing, developing, implementing and operating the multi-model coupled Earth system modeling system that will be needed to support effective decision making. Specifically, this request involves:

- Improvements in the representation of key physical processes at required model resolutions.
- Coupled data assimilation in which observations in one medium (e.g. ocean) are used to update not only that medium but others (e.g. atmosphere); and coupled modeling in which processes in one medium (e.g. ocean mixing and heat transport) produce changes in others (e.g. atmosphere surface heating).
- Ensemble prediction system improvement, through improved initialization of models in the ensemble and more sophisticated processing of output.

This request includes \$1 million for high performance computing (HPC) capacity to support the modeling effort. It will provide an additional 60 teraflops (TF) of computational capacity and approximately 1/2 petabyte (PB) of additional storage capacity to the planned NOAA compute infrastructure in Fairmont, West Virginia.

**Statement of Need and Economic Benefits:**

Important decisions in sectors ranging from food security and public health, to emergency management and national security, need additional information farther out than the current ability of 10-14 days. Today, NOAA does not have the ability to make mid-range outlooks better than the climatological average. Specific examples of user needs for mid-range outlook information include:

- Food Security: Regional drought early warning systems are important for the Nation's food security and economy.
- Public Health: Outlooks of impending extreme heat events will inform state and local planning, including emergency management and preparedness.
- Water Resource Management: River flow and river discharge predictions out to 3-4 weeks would assist flood prediction, reservoir management, and hydroelectric power generation.
- Disaster Risk Management: The Federal Emergency Management Agency (FEMA) works closely with NOAA to bridge climate and weather outlooks to inform extreme event disaster preparedness, and to ensure consistent messaging as these events approach.<sup>10</sup>

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<sup>10</sup> [http://www.wmo.int/pages/prog/arep/wwrp/new/documents/S2S\\_Implem\\_plan\\_en.pdf](http://www.wmo.int/pages/prog/arep/wwrp/new/documents/S2S_Implem_plan_en.pdf)

- Arctic Access and Use: Outlooks of melt-out and freeze-up will be important to the oil and gas industry; outlooks of maritime weather and sea ice weeks in advance will be crucial for safe navigation.<sup>11</sup>
- National Security: Security planners need skillful extended range outlooks to assess weather-driven exacerbation of political hotspots and crises, and plan contingencies. International users need improved extended range outlooks for the developing world across sectors including human health (e.g., famine, malaria) and national security.

**Resource Assessment:**

This is a new initiative and does not have any current funding.

**Schedule and Milestone Highlights:**

FY 2017:

- Evaluate physical processes needing improved representation and coupling (e.g. air-ocean, air-land, ice-ocean, air-ice etc.) in existing and follow-on models to improve prediction of physical phenomena

FY 2018:

- Evaluate existing coupled model ensemble generation techniques for potential improvement and identify potential model output post-processing techniques with potential for improved assessments of outlook phenomena and outlook uncertainty
- Begin preliminary research and development activities identified in evaluation process to improve the prediction system
- Deliver additional HPC capacity and provide user access to additional capacity

FY 2019 - 2021

- Test research from previous years in an operational environment and deliver upgrades to operational modeling suite

**Deliverable Highlights:**

- Create Computer codes needed for improvements to coupled modeling system for transition into operations
- Improved data assimilation schemes for transition into the operational data assimilation system
- Improved model components for transition into the operational coupled modeling system
- Annual publication of research results in peer-reviewed publications and presentations for forecaster

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<sup>11</sup> <http://www.arctic.noaa.gov/NOAAarcticactionplan2014.pdf>

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Transitioned upgrades in modeling or data assimilation	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	0	1	2	2	2
<b>Without Increase</b>	0	0	0	0	0	0	0
<b>Description:</b> Upgrades to coupled earth-system models or data assimilation systems capable of participating in experimental Week 3-4 outlook applications.							

<b>Performance Measure:</b> Increase model skill of 500 millibar (mb) outlook for day 21 toward FY 2013 skill at day 14	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	2%	5%	10%	10%	10%
<b>Without Increase</b>	2%	2%	2%	2%	2%	2%	2%
<b>Description:</b> Extend accuracy for global skill from 5 days to 7 days for winds for 850 hPa and 250 hPa levels. This is working towards making the 21-day outlook as accurate as the 14-day outlook was in 2013.							

<b>Performance Measure:</b> Reduction of 7-day forecast error for 850 and 250 wind forecasts toward 5-day skill (baseline FY 2013)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	5%	10%	10%	10%	10%
<b>Without Increase</b>	5%	5%	5%	5%	5%	5%	5%
<b>Description:</b> Extend accuracy for global skill from 5 days to 7 days for winds for 850 hPa and 250 hPa levels.							

<b>Performance Measure:</b> Additional compute capability (teraflops)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	60	60	60	60	60
<b>Without Increase</b>	0	0	0	0	0	0	0
<b>Description:</b> This is an estimate of how much compute capability could be obtained with the budget increase.							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Weather and Air Chemistry Research  
**Program Change:** Research to Improve Mid-Range Weather Outlooks

<b>Object Class</b>		<b>FY 2017 increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$600	\$1,126
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>\$600</u>	<u>\$1,126</u>
12	Civilian personnel benefits	180	336
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	50	68
22	Transportation of things	0	2
23.1	Rental payments to GSA	0	13
23.2	Rental Payments to others	0	28
23.3	Communications, utilities and misc charges	0	29
24	Printing and reproduction	0	2
25.1	Advisory and assistance services	300	478
25.2	Other services	1,000	1,391
25.3	Purchases of goods & services from Gov't accounts	0	420
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	638
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	32
31	Equipment	300	385
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	1,506	7,044
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>3,936</u>	<u>11,992</u>

Due to financial system limitations, the object class detail for the Program reflects the U.S. Weather Research Program PPA.

**U.S. Weather Research Program: Infrasonic Weather Monitoring (Base Funding: \$500,000 and 0 FTE; Program Change: -\$500,000 and 0 FTE):** NOAA requests a decrease of \$500,000 and 0 FTE for a total of \$0 and 0 FTE.

NOAA is using congressionally directed funding as indicated in the Consolidated and Further Continuing Appropriations Act, FY 2016 to initiate this project to understand how infrasonic monitoring methods of violent weather have the potential to improve forecast accuracy. In FY 2017, NOAA proposes to eliminate funding for this research since sufficient funding was provided in FY 2016 to complete an evaluation of this technology.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Weather and Air Chemistry Research  
**Program Change:** Infrasonic Weather Monitoring

<b>Object Class</b>		<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$526
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>\$0</u>	<u>\$526</u>
12	Civilian personnel benefits	0	156
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	18
22	Transportation of things	0	2
23.1	Rental payments to GSA	0	13
23.2	Rental Payments to others	0	28
23.3	Communications, utilities and misc charges	0	29
24	Printing and reproduction	0	2
25.1	Advisory and assistance services	0	178
25.2	Other services	0	391
25.3	Purchases of goods & services from Gov't accounts	0	420
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	638
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	32
31	Equipment	0	85
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	(500)	5,038
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>(500)</u>	<u>7,556</u>

Due to financial system limitations, the object class detail for the Program reflects the U.S. Weather Research Program PPA.

**Weather and Air Chemistry Research: Joint Technology Transfer Initiative (Base Funding: \$6,000,000 and 0 FTE; Program Change: -\$6,000,000 and 0 FTE):** NOAA requests a decrease of \$6,000,000 and 0 FTE for the Joint Technology Transfer Initiative under OAR Weather and Air Chemistry Research. NOAA supports an increase in funding for continuous development and transition of the latest scientific and technological advances into operations, applications, commercialization and other uses. To that end, NOAA requests \$10,000,000 to expand the concept to better serve its full oceanic and atmospheric mission through establishment of a NOAA-wide Research Transition Acceleration Program (RTAP) under OAR Innovative Research and Technology. The RTAP has a similar goal as the Joint Technology Transfer Initiative to enable cost-effective transfer of new methods and tools into operations. Please see the full RTAP program change on page OAR-116.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Weather and Air Chemistry Research  
**Program Change:** Joint Technology Transfer Initiative

<b>Object Class</b>		<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>\$0</u>	<u>\$0</u>
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and misc charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	(6,000)	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>(6,000)</u>	<u>0</u>



**APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES**  
**SUB-PROGRAM: OCEAN, COASTAL, AND GREAT LAKES RESEARCH**

The Ocean, Coastal, and Great Lakes Research sub-program provides science to coastal communities from a wide network of university partners, develop and explore the depths of the ocean to improve understanding of changes in the oceans and Great Lakes.

The Ocean, Coastal, and Great Lakes Research sub-program:

- Improves understanding of the physics, chemistry, and ecology of oceanic, coastal, and Great Lakes systems, including changes in these environments and the impacts of stressors such as changes in temperature, changes in ocean and Great Lakes chemistry, pollution, and invasive species;
- Improves predictive capability for oceanic, coastal, and Great Lakes processes, including developing predictive models for ecosystems, and coupling these with physical and biogeochemical models to create comprehensive Earth System Models for these environments;
- Translates ocean, coastal, and Great Lakes science into services through tools developed for resource managers, policy makers and the public, and through increased education and outreach; and
- Develops and uses cutting edge technology for understanding and exploring the ocean, coasts and Great Lakes.

The ocean, coasts, and Great Lakes are closely tied to the Earth's weather and climate, and a sound understanding of these environments is essential to NOAA's research portfolio as a whole. OAR's ocean, coastal, and Great Lakes programs are diverse, unique and essential to NOAA's mission.

The following Programs, Projects and Activities (PPA) are included in the Ocean, Coastal and Great Lakes Research Sub-program:

**LABORATORIES AND COOPERATIVE INSTITUTES**

The OAR laboratories funded under this PPA include:

**Great Lakes Environmental Research Laboratory (GLERL)**

Established by the Clean Water Act, GLERL's interdisciplinary research program focuses on forecasting environmental changes in the Great Lakes through environmental observations, ecosystem process studies, and integrated modeling. GLERL research uses a proactive approach to develop information and tools for coastal decision makers.

**Pacific Marine Environmental Laboratory (PMEL)**

PMEL scientists observe and predict the physical and geochemical processes driving the world's oceans and their interactions with the earth, atmosphere, ecosystems, and climate. PMEL leads the development and deployment of innovative strategies for ocean observation, and increases understanding of high impact ocean issues. PMEL's Ocean, Coastal, and Great Lakes Research programs encompass Ecosystems and Fisheries Oceanography Coordinated Investigations (Eco-FOCI), acoustics, earth-ocean interactions, and ocean acidification research.

### **Atlantic Oceanographic and Meteorological Laboratory (AOML)**

AOML conducts research to understand the physical, chemical, and biological characteristics and processes of the ocean and atmosphere, both separately and as a coupled system. This research leads to better management of marine resources, and improved ocean and weather services. AOML's research programs are augmented by the Cooperative Institute for Marine and Atmospheric Studies (CIMAS), a nine-member consortium of academic institutions in Florida and the Caribbean.

### **Schedule and Milestone Highlights:**

FY 2017 – 2021

- Continue collection and analysis of acoustic data from Ocean Noise Reference Stations, in coordination with NMFS and NOS
- Submit an annual, synthetic, ecosystem-based assessment of the eastern Bering Sea for the North Pacific Fisheries Management Council
- Demonstrate/test new ocean observing/communication technologies
- Establish and maintain long-term complementary data sets coincident with each reef-based ocean acidification observing platform
- Provide annual numeric nutrient criteria summary

### **Deliverable Highlights:**

- A formalized Integrated Ecosystem Assessment
- Automated and validated ecological forecasts of coral bleaching as a result of data integration through the ICON program
- An integrated conceptual ecosystem model and indicator set for south Florida coastal waters
- Technical Report to describe current and chemical distributions in coastal waters in relation to known point sources, to assessing relative strengths of land-based sources of pollution over southeast Florida reef tracks
- Pre-operational forecast products to alert the over two million coastal Lake Erie residents of algal toxins in drinking water

## **NATIONAL SEA GRANT COLLEGE PROGRAM**

The National Sea Grant College Program (Sea Grant), established by Congress through the National Sea Grant College Program Act, is a Federal-state partnership that turns research into action supporting science-based sustainable practices. This partnership ensures that coastal communities remain engines of economic growth. The Sea Grant programs form a dynamic national network of more than 300 participating institutions represented by more than 2,300 scientists, engineers and outreach experts based at universities across the country.

Sea Grant's program focuses on:

- **Resilient Communities and Economies**: developing vibrant and resilient coastal economies that use comprehensive planning to make informed strategic decisions; improving coastal water resources that sustain human health and ecosystem services; and adapting to the impacts of coastal hazards.
- **Sustainable Fisheries and Aquaculture**: meeting public demand with a safe, secure and sustainable supply of seafood; and helping consumers understand the health benefits of seafood consumption and the safety and sustainability of the seafood they buy.
- **Healthy Coastal Ecosystems**: improving ecosystem services by enhancing health, diversity and abundance of fish, wildlife and plants; assisting coastal managers use ecosystem-based approaches to manage land, water, coastal habitat, and living marine resources.
- **Environmental Literacy and Workforce Development**: providing national leadership by ensuring public literacy in marine, Great Lakes, and coastal issues; developing an informed, diverse marine, Great Lakes, and coastal workforce; and providing tools and trainings needed to improve workforce skills and create or retain jobs.

### **Marine Aquaculture Program**

Marine aquaculture provides safe, secure and sustainable supplies of domestic seafood and decreases reliance on seafood imports. Still, the industry faces many challenges, and the U.S. remains a minor aquaculture producer. The Sea Grant Marine Aquaculture Program, guided by the National Aquaculture Act of 1980, advances this nascent industry through aquaculture research and extension as well as supporting the National Sea Grant Marine Aquaculture Grant Program. This is the only U.S. government grant program dedicated to supporting marine aquaculture development. These grants tackle some of the top challenges to marine aquaculture like reducing fishmeal and fish oil in aquaculture feeds, increasing seafood safety and quality, diversifying species and products.

The Marine Aquaculture Program works with NOAA aquaculture partners the National Marine Fisheries Service (NMFS) and the National Ocean Service (NOS) in coordination with state fisheries managers, seafood processors, fishing associations and consumer groups. These efforts and those of other Federal agencies (e.g. the U.S. Department of Agriculture) are coordinated under the 2014 Strategic Plan for Federal Aquaculture Research.

### **Schedule and Milestone Highlights:**

FY 2017 – 2021

- State programs hold local and regional requests for proposals
- Sea Grant programs are held accountable to their NOAA aligned program plans through external Performance Review Panels
- Complete 45 community climate adaptation projects across the Nation by FY 2018

- Create or retain over 60,000 jobs between 2017 - 2021 as a result of Sea Grant research and outreach in resilient coastal communities, renewable energy, aquaculture, biotechnology, and other emerging industries
- Carry out 20 locally-focused research projects on the impacts of ocean acidification on coastal ecosystems and on commercially important species by FY 2018
- Carry out 50 locally-focused research projects each year to develop techniques and knowledge that will enhance the resilience of coastal communities to economic and environmental hazards

**Deliverable Highlights:**

- Sea Grant will have leveraged nearly \$200 million from state and other partners
- Assist 200 coastal communities to adopt sustainable development principles
- Create and transfer at least 200 decision-support tools/technologies to coastal managers per year
- More than 2,800 acres of degraded ecosystems are restored annually due to Sea Grant activities
- Provide 150,000 coastal resource managers with information/training in local hazard resiliency, and hazard mitigation tools, techniques, and best practices

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Annual economic and societal benefits derived from Sea Grant activities	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Jobs created/retained	10,700	9,600	9,600	9,600	9,600	9,600	9,600
Businesses created/retained	2,220	2,000	2,000	2,000	2,000	2,000	2,000
Economic benefit (millions of dollars)	450	320	320	320	320	320	320
<b>Description:</b> Society benefits from Sea Grant's assistance in developing new businesses/jobs and retaining existing businesses/jobs. This measure also tracks economic (market and non-market) benefits from the development of new ocean, coastal, and Great Lakes resources and technology.							

<b>Performance Measure:</b> Annual number of coastal communities that adopt/implement hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events (per year)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	246	200	200	200	200	200	200
<b>Description:</b> This metric tracks Sea Grant’s contribution to individuals, businesses, and communities that develop comprehensive emergency preparedness and response plans to increase their resiliency and enable them to respond effectively. Sea Grant will contribute to this by building a sound knowledge base to improve forecasting capabilities, by identifying development and best management practices that reduce the vulnerability of people, buildings, and businesses to coastal hazards, and by advancing ways communities can manage and recover from these events when they occur.							

<b>Performance Measure:</b> Coastal communities that have adopted/implemented sustainable development practices and policies as a result of Sea Grant activities (per year)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	574	480	480	480	480	480	480
<b>Description:</b> This metric tracks communities that have made strides in sustainable development with Sea Grant aid – moving beyond analysis and planning into implementation.							

<b>Performance Measure:</b> Cumulative number of tools, technologies, and information services that are used by NOAA partners/customers to improve ecosystem-based management ( 2010 baseline)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	2546	3046	3546	4046	4546	5046	5546
<b>Description:</b> This measure tracks success in translating research findings into tools, technologies and information services that improve the use and management of coastal, ocean, and Great Lakes ecosystems. Examples of tools include: land cover data, benthic habitat maps, and environmental sensitivity index maps. Technologies refer to the transfer of new or underused approaches for addressing coastal management (e.g., remote sensing, biosensors, autonomous underwater vehicles, genetic markers for fishery stocks) and resource development (e.g., culture systems for aquaculture, marine pharmaceuticals). This includes the application of technology to coastal resource management through synthesis, integration, training, and the development of new management tools.							

A full list of current and historical Sea Grant Performance measures and metrics can be found at: <http://seagrants.noaa.gov/NetworkResources/EvaluationandReporting.aspx>

## **OCEAN EXPLORATION AND RESEARCH (OER)**

The ocean is still mostly unknown, but management decisions rely on a complete picture of our oceans. OER addresses this gap by accelerating the pace of discoveries and increasing understanding of the ocean.

OER is the only Federal organization dedicated to ocean exploration. In 2009, Congress officially authorized NOAA to establish the national ocean exploration program in the Ocean Exploration Act. OER supports a continuum of ocean science that makes discoveries via exploration and research, and transitions that new knowledge and capabilities to the rest of NOAA and the science, technology, and ocean management communities.

OER invests in a variety of small- and large-scale projects with Federal and non-Federal partners who have a shared interest in ocean exploration. Examples of large-scale, multiyear exploration partnerships include telepresence, Extended Continental Shelf Mapping (ECS), and National Oceanographic Partnership Program. OER provides funding through competitive extramural grants and intra- and interagency transfers to interdisciplinary teams of scientists, explorers and educators focusing on exploring natural environments and phenomena, searching for and identifying shipwrecks and submerged paleo-landscapes once inhabited by humans. OER also operates and maintains the scientific equipment aboard the NOAA research vessel *Okeanos Explorer*.

### **Schedule and Milestone Highlights:**

FY 2017 – 2021

- Conduct one interagency partnership expedition per year to explore and characterize habitats and ecosystems in deep water areas
- Develop an annual extramural competition for conducting the next phase of research into the potential resources and natural habitats in areas identified through the ECS Mapping Initiative
- Develop an annual extramural competition for the exploration of unknown and poorly known ocean areas where there is a high potential for discovery

### **Deliverable Highlights:**

- Conduct expeditions to locate, map, and prepare baseline characterizations of new habitats and ecosystems, as well as to identify and evaluate new marine resources in the potential ECS
- Complete one Bureau of Ocean Energy Management (BOEM)-NOAA Partnership expedition to explore and characterize habitats and ecosystems the Arctic and other key areas within the U.S. Exclusive Economic Zone (EEZ)
- Conduct Autonomous Underwater Vehicle (AUV) mapping and habitat characterization surveys
- Conduct an increased number of telepresence-enabled systematic expeditions providing opportunities to engage a multitude of shore-based stakeholders and other users in real-time ocean exploration

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Annual number of coastal, marine and Great Lakes ecological characterizations (number of bathymetric expeditions per year)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	1	2	2	1	N/A	N/A	N/A
<b>Description:</b> The ECS effort is a interagency, multi-year effort to define the potential extension of the U.S. continental shelf under international law. Conduct mapping and ecosystem surveys per ECS task force directives. The ECS bathymetric mapping effort is expected to conclude by 2017. Within NOAA, OER intends to use this information strategically to make informed decisions regarding comprehensive exploration and research.							

<b>Performance Measure:</b> Annual number of coastal, marine and Great Lakes ecological characterizations that meet management needs (number of interdisciplinary expeditions per year)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	1	3	1	1	1	1	1
<b>Description:</b> ECS is a interagency, multi-year important effort. This metric shows the continuation of ECS work after the bathymetric work has concluded.							

<b>Performance Measure:</b> Annual number of coastal, marine and Great Lakes ecological characterizations that meet management needs (number of expeditions per year.)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	1	4	1	1	1	1	1
<b>Description:</b> Conduct joint interdisciplinary expeditions with CIOERT, NOAA/NOS/NCCOS, CIMAS, NIUST and other partners to explore and prepare baseline characterizations of mesophotic habitats and ecosystems in the Gulf of Mexico, South Atlantic Bight, and Caribbean. Expeditions may also include discovery of maritime heritage sites significant to American and world history using the latest in advanced technology. Sites include shipwrecks, prehistoric submerged landscapes, and other maritime cultural sites.							

<b>Performance Measure:</b> Annual number of coastal, marine and Great Lakes ecological characterizations (number of expeditions per year.)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	6	9	6	6	6	6	6
<b>Description:</b> Conduct systematic exploration, mapping and characterization of unknown areas in national and international waters using the NOAA research vessel <i>Okeanos Explorer</i> and provide information and products to multiple users through telepresence links. The <i>Okeanos Explorer</i> offers a new approach to discovery: systematic exploration. This approach includes: (a) telepresence, the ability to bring scientific expertise virtually to the vessel through live connections between shore and sea, (b) a next-generation multi-beam sonar system, and (c) a highly sophisticated remotely operated vehicle (ROV). The ship's telepresence system delivers live images from the ship's ROV and maps from its multi-beam sonar to support live interactions between the <i>Okeanos Explorer</i> and centers located throughout the world.							

<b>Performance Measure:</b> Number of tools, technologies, and information services that are used by NOAA partners/customers to improve ecosystem-based management	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	2	4	2	2	2	2	2
<b>Description:</b> Work towards this performance measure represents the cumulative number of projects OER partners/customers that use the cutting edge exploration technologies mission systems on the NOAA Ship <i>Okeanos Explorer</i> and associated shore-based network, as well as the data collection, processing and dissemination tools developed in partnership with NESDIS.							

<b>Performance Measure:</b> Annually prepare engagement products expressly tied to OER's mission to enhance ocean science literacy	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	6	9	6	6	6	6	6
<b>Description:</b> The goal of OER's engagement strategy and products is to increase access to, understanding of, and appreciation for systematic deep-ocean exploration and its importance in forming the baseline for ocean research, management, and policy decisions.							



## **OTHER ECOSYSTEMS PROGRAMS**

### **NOAA Ocean Acidification Program (OAP)**

Ocean acidification (OA) refers to changes in the carbonate chemistry of the ocean. About a quarter of carbon dioxide in the atmosphere dissolves into the ocean. This causes a decrease in pH and an array of other chemical changes that can affect a variety of organisms, particularly those with calcium carbonate shells or skeletons (i.e. shellfish, corals, plankton). These changes increasingly impact global coastal and oceanic ecosystems and related industries, as atmospheric CO<sub>2</sub> continues to rise.

Understanding OA and predicting the consequences for marine resources is necessary for informing national and international carbon mitigation discussions and enabling local communities to better mitigate, prepare, and adapt to changes caused by OA. NOAA OAP was established by the Federal Ocean Acidification Research and Monitoring Act (FOARAM), to better understand OA.

OAP's work ensures that U.S. marine dependent industries are resilient to ocean acidification by providing accurate and timely environmental intelligence about how OA will affect living marine resources. In accordance with FOARAM and the Interagency Working Group on Ocean Acidification (IWG-OA) strategic plan, the NOAA OAP coordinates, directs, and funds activities across the agency. OAP is also responsive to additional requirements introduced in the Magnuson Stevens Reauthorization Act.

To achieve FOARAM requirements, the OAP:

1. Promotes the development of an ocean, coral reef, and coastal OA monitoring network comprised of targeted geochemical/ecological synoptic surveys, fixed time-series stations, and autonomous underway observations.
2. Funds a range of experimental studies examining the sensitivity of commercially important living marine resources under NOAA's purview to OA.
3. Promotes the development of forecasting models of ecosystem and socioeconomic impacts.
4. Invests in critical new technologies that can facilitate geochemical and ecosystem monitoring.
5. Conducts outreach and education to explain ocean acidification and its potential impacts on ecosystems and society.
6. Supports research to identify and develop adaptation strategies for impacted communities.

The value of ocean acidification research is already evident in the Pacific Northwest where oyster hatcheries on the verge of collapse just a few years ago are again major contributors to the estimated \$270 million shellfish industry.<sup>12</sup> A \$500,000 investment in monitoring coastal seawater, which enables hatchery managers to schedule production when water quality is good,

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<sup>12</sup> Washington State Blue Ribbon Panel on Ocean Acidification (2012): Ocean Acidification: From Knowledge to Action, Washington State's Strategic Response. H. Adelman and L. Whitely Binder (eds). Washington Department of Ecology, Olympia, Washington. Publication no. 12-01-015. [www.ecy.wa.gov](http://www.ecy.wa.gov); <http://www.nmfs.noaa.gov/stories/2011/12/shellfish.html>; <http://pcsga.org/economics/>

is helping to restore commercial hatcheries and expected to reap an estimated \$35 million for coastal communities in Oregon and Washington.<sup>13</sup>

**Schedule and Milestone Highlights:**

FY 2017 - 2021

- Deploy and maintain OA moorings and coral reef monitoring sites
- Conduct Ocean Acidification coastal observing and process research cruises and deploy OA sensors on NOAA research and volunteer observing ships
- Develop high-resolution physical-biogeochemical-ecosystem and socioeconomic regional models critical for developing adaptation strategies
- Develop a coastal early-warning system that can identify episodic low pH events and alert managers of potentially impacted resources
- Partner with IOOS Marine Sensor Program to develop marine sensors that can assist coastal industries with both scientific and monitoring capacity

**Deliverable Highlights:**

- Integrated assessments of the ecological and societal impacts of ocean acidification in each U.S. coastal region and the Great Lakes
- Standardized chemical and biological monitoring protocols for the measurement of carbon dioxide system parameters and physiological effects on marine organisms
- Predictions of pH and carbonate saturation in the future ocean using global climate change model projections
- Regional biogeochemical and ecological models developed
- Optimized observing systems in each of the eight large marine ecosystem regions
- Increased number of living marine resources characterized for vulnerability to ocean acidification

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b>	<b>FY 2015 Target</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Cumulative number of industry partners receiving ocean acidification adaptation technologies and methods	2	4	6	7	8	9	10
<b>Description:</b> Industry partners provided direct scientific and monitoring support to aid them in designing adaptive management technologies and strategies that promote resilience to enhanced coastal OA conditions.							

<sup>13</sup> **Impacts of Coastal Acidification on the Pacific Northwest Shellfish Industry and Adaptation Strategies Implemented in Response**, A. Barton, G.G. Waldbusser, R.A. Feely, S.B. Weisberg, J.A. Newton, B. Hales, S. Cudd, B. Eudeline, C.J. Langdon, I.W. Jefferds, T. King, A. Suhrbier, and K. McLaughlin. 2015. *Oceanography* 28(2):146–159, <http://dx.doi.org/10.5670/oceanog.2015.38>

## **SUSTAINED OCEAN OBSERVATIONS AND MONITORING**

Global Ocean Observing System (GOOS) is a permanent global system for observations, modelling and analysis of marine and ocean variables to support operational ocean services worldwide. GOOS provides accurate descriptions of the present state of the oceans, including living resources; continuous forecasts of the future conditions of the sea for as far ahead as possible, and the basis for forecasting climate variability and change.

As observing systems evolve to address research needs, OAR develops and sustains key components of GOOS through its Climate Program Office, primarily through partnerships across NOAA (e.g. AOML, PMEL), and with its Cooperative Institutes. Partnerships with other Federal agencies, international organizations, and the private sector are also essential to sustain and evolve an effective global in situ observing system.

The U.S. Integrated Ocean Observing System (IOOS) is the U.S. regional contribution to GOOS. In turn, global ocean observing activities contribute unique and essential global measurements and capabilities to the U.S. IOOS enterprise. IOOS is codified in the Integrated Coastal and Ocean Observation System Act. The Act explicitly vests authority in NOAA as the lead Federal bureau for implementation and administration of the System and charges NOAA to establish a U.S. IOOS Program Office. All components of IOOS require international partnerships and contributions. This observation system is based on measuring a set of internationally agreed upon variables to provide information needed by the U.S. and other nations to effectively plan and manage their response to climate variability and change.

Major elements of GOOS that NOAA contributes to include:

- Argo Profiling Floats
- Surface Drifting Buoys
- Tide Gauge Stations
- Tropical Moored Buoys
- Ocean Reference Stations
- Ships of Opportunity
- Ocean Carbon Networks
- Dedicated Ships
- Data Management and Analysis
- Climate Monitoring, Analyses, and Diagnostics (CMAD)

### **Deliverable Highlights:**

- 9 ocean reference stations (cumulative total number) 1,000 drifting buoys deployed annually
- 250 Argo Array Buoys deployed annually
- 35 Tropical Moored Buoys (cumulative total number)
- 80 Tide Gauge Reference Stations
- 34 Ocean carbon surveys conducted (cumulative total number)
- 200 days dedicated ship support (cumulative total days at sea)
- Integration of Deep Argo data into the Argo Data Management System
- Annual Competitive Grant Competitions

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Percent error reduction of ocean and meridional heat transport estimates	1.6	1.9	2.2	2.5	2.8	3.1	3.4
<p><b>Description:</b> As a result of AOML observations, research, and reports on the state of the ocean, heat storage, and meridional heat transport in the Atlantic Ocean, there will be increased knowledge for scientists creating modeled estimates of heat transport over time, leading to less uncertainty in those models.</p>							

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Increase cumulative number of data collection platforms deployed by PMEL in support of the Global Ocean Observing System (GOOS)	823	921	959	996	1029	1057	1081
<p><b>Description:</b> This measure represents a significant portion of PMEL's contribution to GOOS. The measure identifies each Argo float deployed and each moored buoy from the PIRATA, RAMA, and ocean climate station programs as a unit; TAO is not included as it is maintained by the National Weather Service. GOOS is designed to: 1) Monitor, understand, and predict weather and climate; 2) Describe and forecast the state of the ocean, including living resources; 3) Improve management of marine and coastal ecosystems and resources; 4) Mitigate damage from natural hazards and pollution; 5) Protect life and property on coasts and at sea; and 6) Enable scientific research. Completion of GOOS is analogous to the global weather observing system since fully-implemented GOOS will provide ocean data that all nations can use to provide improved ocean-related analytical and predictive products (forecasts).</p>							

## PROGRAM CHANGES FOR FY 2017:

**Ocean, Coastal and Great Lakes Research Laboratories and Cooperative Institutes: Autonomous Underwater Vehicle Demonstration (Base Funding: \$2,000,000 and 0 FTE; Program Change: -\$2,000,000 and 0 FTE):** NOAA requests a decrease of \$2,000,000 and 0 FTE for a total of \$0 to eliminate support for an autonomous underwater vehicle (AUV) testbed.

### Proposed Actions:

The AUV demonstration was established in 2014. In 2016 a number of candidate vehicles and/or technologies will be procured for testing various instrument suites for on-going development/integration. With this reduction, the pace of evaluating new technologies for ocean observations will be slowed.

NOAA will maintain its fleet of autonomous vehicles and other alternative technologies, and will continue to support a Requests for Proposals (RFP) process open to NOAA Labs and Cooperative Institutes but will reduce the funding available for ongoing development, testing and evaluation activities. NOAA and its partners will continue to develop innovative instrumentation, with testing and evaluations in the marine environment with vessels of opportunity.

### Resource Assessment:

Current resources are used to identify and provide an array of surface and subsurface autonomous vehicles and other appropriate technology to support ocean observations for NOAA use. AUV demonstration funding will decrease in FY 2017.

### Schedule and Milestone Highlights:

- Cease support for the AUV demonstration in FY 2017

### Deliverable Highlights:

- Identify high priority technologies as candidate systems for development/ integration

### Performance Goals and Measurement Data:

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Identify high priority technologies as candidate systems for development/ integration. (annual)							
<b>With Decrease</b>	N/A	N/A	2	2	2	2	2
<b>Without Decrease</b>	1	4	4	4	4	4	4

**Description:** NOAA envisions funding, on average, two technologies per year, but depending on the complexity of the technologies chosen, it may be necessary to fund only one new technology in some years with the existing funding level.

<b>Performance Measure:</b> Demonstration/testing of new technologies (cumulative)	<b>FY 2015 Actual</b>	<b>FY 2016 Actual</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Decrease</b>	N/A	N/A	1	2	2	2	2
<b>Without Decrease</b>	2	2	3	4	4	5	5
<b>Description:</b> Successful demonstration of new technologies will depend on the degree of difficulty in the development of those technologies. More complex technologies can require 5 years or more to bring to an operational demonstration status. This measure is an approximation only.							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Ocean, Coastal and Great Lakes Research  
**Program Change:** Autonomous Underwater Vehicle Demonstrations

<b>Object Class</b>	<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$8,025
11.3 Other than full-time permanent	0	0
11.5 Other personnel compensation	0	0
11.6 Leave Surcharge Full-Time	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	<u>\$0</u>	<u>\$8,025</u>
12 Civilian personnel benefits	0	2,087
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	283
22 Transportation of things	0	107
23.1 Rental payments to GSA	0	60
23.2 Rental Payments to others	0	123
23.3 Communications, utilities and misc charges	0	52
24 Printing and reproduction	0	5
25.1 Advisory and assistance services	0	0
25.2 Other services	0	0
25.3 Purchases of goods & services from Gov't accounts	0	0
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	4,051
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	26
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	61
31 Equipment	(1,800)	265
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	(200)	15,229
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	<u>(2,000)</u>	<u>30,374</u>

Due to financial system limitations, the object class detail for the Program reflects the Ocean, Coastal and Great Lakes Research Laboratories & Cooperative Institutes PPA.

**Ocean, Coastal and Great Lakes Laboratories and Cooperative Institutes: Base Research (Base Funding: \$32,374,000 and 132 FTE; Program Change: -\$2,985,000 and 0 FTE):**

NOAA requests a decrease of \$2,985,000 and 0 FTE for a total of \$29,389,000 and 132 FTE to decrease Cooperative Institute (CI) support for planned research projects in FY 2017. NOAA will narrow scope of funded research, broadly spread across its Cooperative Institutes partners, to focus on areas such as:

- Improved protection, restoration, and management of coastal and ocean resources;
- Monitoring of ocean, coastal, and Great Lakes ecosystems, including coral;
- Supporting ecosystem modeling and forecasting; and
- Encouraging technology transfer and efficient resource management.

NOAA will continue its traditional relationships with CIs in accomplishing the above objectives. NOAA research labs will continue to involve CI researchers using base resources. NOAA will make awards to CI's where they can make significant advances through such partnerships.



**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Ocean, Coastal and Great Lakes Research  
**Program Change:** Base Research

<b>Object Class</b>	<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
Personnel compensation		
Full-time permanent	\$0	\$8,025
Other than full-time permanent	0	0
Other personnel compensation	0	0
Leave Surcharge Full-Time	0	0
Special personnel services payments	0	0
Total personnel compensation	\$0	\$8,025
Civilian personnel benefits	0	2,087
Benefits for former personnel	0	0
Travel and transportation of persons	(60)	223
Transportation of things	(5)	102
Rental payments to GSA	0	60
Rental Payments to others	0	123
Communications, utilities and misc charges	(2)	50
Printing and reproduction	0	5
Advisory and assistance services	0	0
Other services	0	0
Purchases of goods & services from Gov't accounts	0	0
Operation and maintenance of facilities	0	0
Research and development contracts	(158)	3,893
Medical care	0	0
Operation and maintenance of equipment	0	26
Subsistence and support of persons	0	0
Supplies and materials	(20)	41
Equipment	0	2,065
Lands and structures	0	0
Investments and loans	0	0
Grants, subsidies and contributions	(2,740)	12,689
Insurance claims and indemnities	0	0
Interest and dividends	0	0
Refunds	0	0
Total obligations	(2,985)	29,389

Due to financial system limitations, the object class detail for the Program reflects the Ocean, Coastal and Great Lakes Research Laboratories & Cooperative Institutes PPA.

**National Sea Grant College Program Base: National Sea Grant College Program (Base Funding: \$64,448,000 and 13 FTE; Program Change: -\$2,548,000 and 0 FTE):** NOAA requests a decrease of \$ 2,548,000 and 0 FTE for a total of \$ 61,900,000 and 13 FTE to reduce funding for research.

**Proposed Actions:**

NOAA Sea Grant will decrease the amount of research funding available for competitively awarded projects. The decrease will result in funding approximately 30 fewer research projects in 2017 compared to the 2016 enacted funding level. NOAA will continue to support Sea Grant funds through its network of 33 Sea Grant Colleges by funding approximately 220-270 research projects in FY 2017. NOAA will continue to create or retain jobs as a result of Sea Grant research and outreach.

**Resource Assessment:**

Resources for this activity are described in the National Sea Grant College Program narrative.

**Schedule and Milestone Highlights:**

FY 2017 - 2021

- Create or retain over 53,090 jobs as a result of Sea Grant research and outreach in renewable energy, aquaculture, biotechnology, and other emerging industries

**Deliverable Highlights:**

- Create and transfer at least 175 decision-support tools/technologies to coastal managers per year

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Cumulative number of tools, technologies, and information services that are used by NOAA partners/customers to improve ecosystem-based management (2010 baseline)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Decrease</b>	N/A	N/A	3,220	3,660	4,090	4,520	4,520
<b>Without Decrease</b>	N/A	2,820	3,320	3,820	4,320	4,820	4,820
<b>Description:</b> This measure tracks success in translating research findings into tools, technologies and information services that improve the use and management of coastal, ocean, and Great Lakes ecosystems. Examples of tools include: land cover data, benthic habitat maps, and environmental sensitivity index maps. Technologies refer to the transfer of new or underused approaches for addressing coastal management (e.g., remote sensing, biosensors, autonomous underwater vehicles, genetic markers for fishery stocks) and resource development (e.g., culture systems for aquaculture, marine pharmaceuticals). This includes the application of technology to coastal resource management through synthesis, integration, training, and the development of new management tools.							

<b>Performance Measure:</b> Annual economic and societal benefits derived from Sea Grant activities	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Decrease:</b>							
Jobs created/retained	N/A	N/A	9,445	9,445	9,445	9,445	9,445
Businesses created/retained	N/A	N/A	1,965	1,965	1,965	1,965	1,965
Economic benefit (millions of dollars)	N/A	N/A	\$315	\$315	\$315	\$315	\$315
<b>Without Decrease:</b>							
Jobs created/retained	NA	9,600	9,600	9,600	9,600	9,600	9,600
Businesses created/retained	NA	2,000	2,000	2,000	2,000	2,000	2,000
Economic benefit (millions of dollars)	NA	\$320	\$320	\$320	\$320	\$320	\$320
<b>Description:</b> Society benefits from Sea Grant's assistance in developing new businesses/jobs and retaining existing businesses/jobs. This measure also tracks economic (market and non-market) benefits from the development of new ocean, coastal, and Great Lakes resources and technology.							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Ocean, Coastal and Great Lakes Research  
**Program Change:** National Sea Grant College Program

<b>Object Class</b>		<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$1,088
11.3	Other than full-time permanent	0	86
11.5	Other personnel compensation	0	0
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	\$0	\$1,174
12	Civilian personnel benefits	0	348
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	(60)	47
22	Transportation of things	(5)	102
23.1	Rental payments to GSA	0	263
23.2	Rental Payments to others	0	1,000
23.3	Communications, utilities and misc charges	(2)	48
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	724
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	1,465
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	(158)	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	(20)	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	(2,303)	56,729
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	(2,548)	61,900

**Marine Aquaculture Program: Marine Aquaculture: (Base Funding \$9,000,000 and 1 FTE; Program Change: -\$2,000,000 and 0 FTE)**: NOAA requests a decrease of \$ 2,000,000 and 0 FTE for a total of \$ 7,000,000 and 1 FTE to reduce research and extension projects.

**Proposed Actions:**

NOAA is using congressionally directed funding as indicated in the Consolidated Appropriations Act, FY 2016 to increase the diversification of the Sea Grant aquaculture portfolio. Through these projects, Sea Grant will develop and transfer new and improved technologies; improve aquaculture practices; and fund aquaculture-related extension activities that contribute to both economic and environmental community resilience. These resources will provide additional funds to Sea Grant's competitive portfolio of projects that focus on generating scientific knowledge for industry development, producing innovative university research, and providing extension/tool and technology transfer to support sustainable domestic aquaculture.

In FY 2017, Sea Grant will continue, at a reduced amount, to fund a competitive portfolio of research and extension projects.

**Resource Assessment:**

Resources for this activity are described in the National Sea Grant College Program narrative.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Ocean, Coastal and Great Lakes Research  
**Program Change:** Marine Aquaculture

<b>Object Class</b>		<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>\$0</u>	<u>\$0</u>
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and misc charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	(2,000)	7,000
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>(2,000)</u>	<u>7,000</u>

**Ocean Exploration and Research: Ocean Exploration (Base Funding: \$32,224,000 and 20 FTE; Program Change: -\$ 12,656,000 and 0 FTE):** NOAA requests a decrease of \$12,656,000 and 0 FTE for a total of \$19,568,000 and 20 FTE to reduce mapping and exploration of unknown and poorly known ocean areas and phenomena.

**Proposed Actions:**

NOAA will apply the decrease to the Ocean Exploration and Research (OER) Program through an across the board decrease in program activities. NOAA will be able to continue funding a limited number of days for Extended Continental Shelf mapping and conduct a limited number of exploration missions aboard the NOAA vessel Okeanos Explorer and Ocean Exploration Trust operated Exploration Vessel Nautilus.

The OER program will also be able to provide reduced funding to the Cooperative Institute for Ocean Exploration, Research and Technology and the Global Foundation for Ocean Exploration to support NOAA relevant exploration, education, and outreach activities. In addition, OER will provide limited funding for extramural grants through the Federal Funding Opportunity announcement. This decrease will eliminate financial support for interagency biodiversity observation network funding.

**Resource Assessment:**

Current resources for this activity are described in the Ocean, Coastal and Great Lakes Research narrative.

**Schedule and Milestone Highlights:**

FY 2017 - 2021

- Conduct one interagency partnership (e.g., BOEM, USGS) expeditions per year to explore and characterize habitats and ecosystems in deep water areas of the Gulf of Mexico, the Mid-Atlantic Bight, the Arctic, and other high priority areas
- Acquire limited amount of Days-At-Sea on the University-National Oceanographic Laboratory System (UNOLS), Navy, NOAA and other vessels to continue the baseline mapping of the potential ECS

**Deliverable Highlights:**

- One BOEM-NOAA partnership expedition to explore and characterize habitats and ecosystems in deep water areas in the Mid-Atlantic Bight and expand this highly leveraged National Oceanographic Partnership Program sanctioned partnership into the Arctic and other EEZ regions, generating maps, peer-review journal reports, and other products
- Autonomous Underwater Vehicle mapping and habitat characterization surveys generating maps and databases containing information on environmental and oceanographic conditions in the areas surveyed

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Annual number of coastal, marine and Great Lakes ecological characterizations (number of bathymetric expeditions per year)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Decrease</b>	N/A	N/A	0	0	0	0	0
<b>Without Decrease</b>	2	2	2	2	2	2	2
<b>Description:</b> The ECS effort is a interagency, multi-year effort to define the potential extension of the U.S. continental shelf under international law. Conduct mapping and ecosystem surveys per ECS task force directives. The ECS bathymetric mapping effort is expected to conclude by 2017. Within NOAA, OER intends to use this information strategically to make informed decisions regarding comprehensive exploration and research.							

<b>Performance Measure:</b> Annual number of coastal, marine and Great Lakes ecological characterizations that meet management needs (number of interdisciplinary expeditions per year)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Decrease</b>	N/A	N/A	1	1	1	1	1
<b>Without Decrease</b>	3	3	3	3	3	3	3
<b>Description:</b> The ECS effort is a high-level interagency multi-year effort to define the potential extension of the U.S. continental shelf under international law. Using the information collected during previous bathymetric mapping cruises, identify high-priority areas that may contain unique and vulnerable habitats and/or marine resources, and conduct interdisciplinary exploration expeditions to establish baseline characterizations.							

<b>Performance Measure:</b> Number of tools, technologies, and information services that are used by NOAA partners/customers to improve ecosystem-based management	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Decrease</b>	N/A	N/A	1	1	1	1	1
<b>Without Decrease</b>	4	4	4	4	4	4	4
<b>Description:</b> Work towards this performance measure represents the cumulative number of projects OER partners/customers that use the cutting edge exploration technologies mission systems on the NOAA Ship <i>Okeanos Explorer</i> and associated shore-based network, as well as the data collection, processing and dissemination tools.							



**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Ocean, Coastal and great Lakes Research  
**Program Change:** Ocean Exploration

<b>Object Class</b>	<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$0
11.3 Other than full-time permanent	0	2,837
11.5 Other personnel compensation	0	369
11.6 Leave Surcharge Full-Time	0	117
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	<u>\$0</u>	<u>\$3,323</u>
12 Civilian personnel benefits	0	801
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	(60)	252
22 Transportation of things	(40)	42
23.1 Rental payments to GSA	0	252
23.2 Rental Payments to others	0	49
23.3 Communications, utilities and misc charges	(800)	693
24 Printing and reproduction	0	18
25.1 Advisory and assistance services	(80)	1,725
25.2 Other services	(713)	0
25.3 Purchases of goods & services from Gov't accounts	0	2,494
25.4 Operation and maintenance of facilities	0	1,844
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	(200)	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	(300)	0
31 Equipment	(1,200)	0
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	(9,263)	8,075
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	<u>(12,656)</u>	<u>19,568</u>

**Integrated Ocean Acidification: Integrated Ocean Acidification (Base Funding: \$10,070,000 and 18 FTE; Program Change: +\$11,705,000 and 0 FTE):** NOAA requests an increase of \$11,705,000 and 0 FTE for a total of \$21,775,000 and 18 FTE to expand understanding of ocean acidification (OA) by building a robust observation network to inform vulnerability assessments, expanding models and early warning systems, and continuing to focus on adaptation activities.

**Proposed Actions:**

Funding in the FY 2016 Enacted enables NOAA to continue its technology development partnerships with industry and academia for aquaculture, test new modeling capabilities for acute acidification episodes for certain vulnerable regions, expand data synthesis and visualization product development, and solicit community input for the National Ocean Acidification Information Exchange (FOARAM).

The FY 2017 request builds upon the FY 2016 funding by expanding the existing OA observing networks to better inform the development of adaptation and mitigation strategies. Currently, OA observations are largely focused on open ocean. However, many stakeholders who are vulnerable to OA, like the aquaculture industry, are concentrated in coastal areas where ocean chemistry is more variable. Stakeholders will be able to better monitor OA and its impacts locally with a more robust OA observing network. To enhance the network, NOAA will:

- Further the development of advanced technologies to enable cost-effective, routine, *in situ* observing of both chemical and ecological indices. This will be done in partnership with the Integrated Ocean Observing System (IOOS).
- Advance regionally targeted studies on methods for optimizing OA observing within coastal, estuarine, coral reef, and shelf environments. These observing optimization studies will be informed by regional vulnerability assessments.

In conjunction with this OA observing network, NOAA will help coastal industries and policymakers prioritize OA threats and make science-based decisions to reduce OA impacts. Additional funding would be used to expand understanding of the vulnerability of our coastal communities, and to further investigate adaptation options at local to regional scales. Specifically, NOAA will:

- Expand laboratory and field research, in collaboration with NMFS and academic partners, on the biological impacts of OA on targeted commercial and recreational fishery species, the prey they rely on, and important marine habitats.
- Develop regional OA vulnerability assessments, starting with regions where OA impacts have already been documented, such as the Pacific Northwest.
- Develop and test innovative adaptation strategies, through intramural and competitive awards, to provide the most viable adaptation options and to evaluate local environmental impacts from OA.
- Expand the geographic coverage of regionally focused, linked biogeochemical and ecosystem models to provide information for managers, like how reducing runoff or using alternative species for aquaculture might reduce local OA impacts.
- Develop products specific to user needs, with community input, such as visualizations and syntheses of changing ocean water chemistry at global, regional, and local scales, with an emphasis on high priority regions and short- and long-term OA forecasts (e.g. early warnings for shellfish growers).

- Build a national Information Exchange through the selection of an entity to develop and oversee this important national effort.

This proposed investment will enable NOAA to better inform national and regional stakeholders about the consequences of OA, allow coastal resource managers to employ adaptive strategies, and enable NOAA to lead national and international coordination efforts necessary to achieve maximum leverage and cost efficiency.

**Statement of Need and Economic Benefits:**

Global ocean chemistry is changing at least ten times faster than any time over the past 50 million years.<sup>14</sup> OA has been associated with changes in a broad range of biological processes in many marine species. In fact, OA is already having a negative impact on coral reefs and shellfish, causing marine resource managers (including industry owners) to request enhanced information on how to adapt to the changing ocean conditions. In 2009, U.S. shellfish represented about half the total seafood revenue estimated at \$3.9 billion.<sup>15</sup> In Washington State alone, the shellfish industry generates \$270 million annually, and directly and indirectly supports 3200 jobs. Recreational oyster and clam harvesters contribute more than \$27 million annually to coastal economies.<sup>16</sup> Coral reefs also provide \$30 billion in ecosystem services to local communities.<sup>17</sup> NOAA’s scientific contributions to oyster hatcheries in Washington and Oregon have already helped reverse OA-related financial losses. Still, additional information, models, and tools are needed to help affected industries and stakeholders adapt to these changing conditions.

**Resource Assessment:**

Resources for this program can be found in the Ocean, Coastal and Great Lakes narrative.

**Schedule and Milestone Highlights:**

**FY 2017**

- Make first five-year award for establishment of the Information Exchange
- Expand capacity for OA data sharing in the National Centers for Environmental Information, including development of automated data services

**FY 2018**

- Award competitive grants for 1) technology and other innovative adaptation strategy development and 2) expansion of regional OA forecast models to new regions;

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<sup>14</sup> Honisch, B. et al. 2012. The Geological Record of Ocean Acidification. *Science*. Vol 335: p1058-1063.

<sup>15</sup> U.S. summary data (page 7) of the 2009 NMFS Fisheries Economics report.

<sup>16</sup> Washington Shellfish Initiative white paper, December 2011, [http://www.mypugetsound.net/index.php?option=com\\_docman&task=doc\\_view&gid=589&Itemid=238](http://www.mypugetsound.net/index.php?option=com_docman&task=doc_view&gid=589&Itemid=238); Washington State Blue Ribbon Panel on Ocean Acidification. 2012. Ocean Acidification: From Knowledge to Action (Washington State’s Strategic Response). p. xv. <https://fortress.wa.gov/ecy/publications/publications/1201015.pdf/>.

<sup>17</sup> Cesar, H., L. Burke, and L. Pet-Soede. 2003. The Economics of Worldwide Coral Reef Degradation. Cesar Environmental Economics Consulting (CEEC), 6828GH Arnhem, The Netherlands, 23 pp.

announce competitive requests for proposals (RFPs) for observing optimization studies for six regions

- Transition to commercial production new technologies for use by impacted industries

FY 2019

- Announce competitive RFPs to conduct vulnerability assessments in two more regions

FY 2020

- Develop biogeochemical/ecosystem impacts models for at least six more coastal regions and release initial projections of potential future chemistry and ecosystem conditions under OA

FY 2021

- Starting in 2017, add at least six more *in situ* OA observing sites as well as expand observing capacity (surface and subsurface sensors) for existing sites

**Deliverable Highlights:**

- Vulnerability assessments in 5 coastal regions or subregions, which will define where ecological and societal vulnerabilities exist and where adaptation strategies must be developed; initial adaptation strategies tested and applied in several of these regions
- Regional biogeochemical and ecosystem models useful for projecting the impacts of OA on living marine resources and their ecosystems and informing management decisions from fisheries to anthropogenic inputs that enhance local acidification
- Readily available data products, which provide actionable information to policymakers and coastal managers
- Expanded number of commercially important species assessed for vulnerability to ocean acidification
- Optimized and expanded observing system in 5 coastal regions or subregions designed to make observing data collection more effective and efficient

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Number of industry partners provided scientific capacity through OA adaptation technologies and methods (cumulative)							
<b>With Increase</b>	N/A	N/A	8	9	11	12	16
<b>Without Increase</b>	2	4	8	9	9	10	10
<b>Description:</b> Industry partners provided direct scientific and monitoring support to aid them in designing adaptive management technologies and strategies that promote resilience to enhanced coastal OA conditions.							

<b>Performance Measure:</b> Cumulative number of living marine resources characterized for vulnerability to OA	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	64	74	84	94	104
<b>Without Increase</b>	50	57	64	71	78	85	92
<b>Description:</b> Cumulative number of economically important species (or species on which those commercially important species rely) whose vulnerability to ocean acidification has been tested in NOAA or university laboratories. Additional funding will support research on more species and in-depth studies on species that warrant extensive examination.							

<b>Performance Measure:</b> Number of sites with <i>in situ</i> -based fixed and underway platforms that are accurately measuring the carbon parameters needed to calculate mean annual Aragonite Saturation State determined to be within 0.2 units of the actual mean	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	22	24	25	26	26
<b>Without Increase</b>	17	19	20	20	20	20	20
<b>Description:</b> This measure represents an annual inventory of <i>in situ</i> -based fixed and underway observing platforms dedicated to monitoring the magnitude, and rate of biogeochemical changes in response to increasing atmospheric carbon dioxide. Monitoring sites will be located in ecologically and economically important marine ecosystems, especially coral reefs in coordination with the Coral Reef Conservation Program. These ocean acidification observing platforms are defined by their inherent ability to fully constrain the carbonic acid system, as well as observing biological change, and must be capable of resolving decadal changes in ocean chemistry in response to ocean acidification. The data provided will be used by Federal and state regulatory agencies and commercial fisheries organizations and will contribute to and comply with the Global OA Observing Network.							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Ocean, Coastal and Great Lakes Research  
**Program Change:** Integrated Ocean Acidification

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$372	\$1,072
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	\$372	\$1,072
12	Civilian personnel benefits	82	236
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	89	315
22	Transportation of things	50	203
23.1	Rental payments to GSA	450	753
23.2	Rental Payments to others	0	21
23.3	Communications, utilities and misc charges	0	15
24	Printing and reproduction	10	23
25.1	Advisory and assistance services	0	51
25.2	Other services	0	83
25.3	Purchases of goods & services from Gov't accounts	0	1,487
25.4	Operation and maintenance of facilities	400	609
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	2,000	3,000
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	1,500	2,451
31	Equipment	2,750	3,784
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	4,002	7,672
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	11,705	21,775

**APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES**  
**SUB-PROGRAM: INNOVATIVE RESEARCH AND TECHNOLOGY**

The Innovative Research and Technology sub-program accelerates the adoption of advanced computing, communications, and information technology throughout NOAA. Innovative Research and Technology supports High Performance Computing (HPC) Initiatives through major improvements in weather and climate forecasting, ecosystem and ocean modeling, and environmental information dissemination.

NOAA is an active participant in the White House Office of Science and Technology Networking and Information Technology Research and Development (NITRD) program. Funding through Innovative Research and Technology allows NOAA to participate in several NITRD interagency working groups including High End Computing, Human Computer Interaction and information management, Large Scale Networking, Software Design and Productivity.

**HIGH PERFORMANCE COMPUTING (HPC) INITIATIVES**

HPC Initiatives, established through the High-Performance Computing Act, improve the accuracy and timeliness of NOAA's short-term weather warnings, forecasts, hurricane forecast improvements, as well as regional and global climate predictions. Timely and responsive dissemination of NOAA's services and information requires full use of modern network and communication technologies.

HPC Initiatives provides NOAA with necessary computational and network resources required to support continued advances in environmental modeling capabilities. Benefits of HPC Initiatives include:

- Improvements in short-term warning and weather forecast systems and models,
- Enabling scientists to attack long-lead time problems associated with the physical processes that govern the behavior of the atmosphere and ocean,
- Maintaining NOAA's leadership position in understanding climate with applications towards critical issues such as hurricanes, drought, sea-level rise, and
- Accelerating modeling and simulation activities and providing relevant decision support information on a timely basis for programs such as the multi-agency Climate Change Science Program.

**Schedule and Milestone Highlights:**

FY 2017 – 2021

- Complete migration of at least one operational model and one research model to next-generation architecture software structure
- Model for Prediction across Scales (MPAS) or another non-hydrostatic global model (dependent on scientific and performance evaluation) running on the graphic processing unit (GPU) and many integrated core (MIC) processors
- Test impact of assimilation of new and proposed satellite observations using OSSE and OSE approaches using the operational HWRF hybrid data assimilation system to improve hurricane intensity guidance
- Test and evaluate advanced moving nest techniques in the next generation global tropical cyclone forecast system
- Quantitative evaluation of (a) (statistically) downscaled climate projections for the U.S. and (b) their suitability for use in climate impacts and decision-making applications published in the peer-reviewed literature

**Deliverable Highlights:**

- HPC System availability – Maximum number of computational hours made available to scientists
- Participate in NITRD interagency activities
- 11 HPC and advanced networking R&D projects
- New prediction systems with higher resolution transitioned into operational units within NOAA
- A new Earth System model, based on CM4 and called ESM4, used to publish high resolution information on the link between climate and oceanic ecosystems

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Maintain High Performance Computing / R&D System Availability	99%	96%	96%	96%	96%	96%	96%
<b>Description:</b> HPC Initiatives provides NOAA researchers with a reliable computing resource that allows them to plan, with a high degree of confidence, their project milestones and deliverables. System outages can adversely affect NOAA initiatives such as meeting the Intergovernmental Panel on Climate Change milestones or cause delays in implementing operational improvements for both hurricane track and intensity predictions. Ensuring high system availability enables NOAA to maximize its investment in these resources.							



## PROGRAM CHANGE FOR FY 2017:

### **Research Transition Acceleration Program: Research Transition Acceleration Program**

**(Base funding: \$0 and 0 FTE; Program Change: +\$10,000,000, and +2 FTE):** NOAA requests an increase of \$10,000,000 and 2 FTE for a total of \$10,000,000 and 2 FTE to create a Research Transition Acceleration Program (RTAP) for the oversight and management of NOAA's Research technology transitions (R2X). This proposal builds on the concepts of, and is directly responsive to the Presidential Memorandum of 2011 memo on *Accelerating Technology Transfer and Commercialization of Federal Research in Support of High-Growth Businesses* and the 2014 Lab-to-Market Initiative (From *Lab to Market: Accelerating Research Breakthroughs and Economic Growth*).

#### **Proposed Actions:**

With FY 2016 enacted funding for a Joint Technology Transfer Initiative, NOAA will establish a program to ensure continuous development and transition of the latest scientific and technological advances to National Weather Service (NWS) Operations. Nonetheless, the need to accelerate cost-effective transfer of new methods and tools extends beyond the current program's weather research scope. Therefore, through the RTAP proposal described here NOAA seeks to establish a broad program that accelerates the transition of the most promising research for the full spectrum of NOAA's mission requirements (e.g., weather, climate, fisheries management, ocean and coastal stewardship) to application and operations.

The rapid transition of research projects to mission-driven applications, operational services, and commercialization is essential to achieve full return on NOAA's Research and Development (R&D) investment and to advance NOAA core missions. Numerous research projects with significant potential to benefit society are ready for rapid transition, but require increased resources for demonstration in relevant test environments, evaluation for commercial potential, and possible patent protection. This program will increase the number of demonstration-ready research activities for application and deployment to NOAA's diverse mission areas and for delivery to external partners and stakeholders. Funding will allow NOAA to accelerate the movement of transition ready projects through the demonstration and test phase of R&D and/or commercial transition using an inclusive system based on the established Technology Readiness Levels (TRLs).<sup>18</sup> RTAP funds will be focused on TRL 5-7.

Projects identified for transition will be evaluated and prioritized for funding based on a common set of criteria, including mission criticality, societal benefit, stakeholder engagement, and availability of detailed plans for reliable delivery of products and services. This enhancement to rapid transition in the demonstration phase will work in tandem with NOAA Lines Office needs.

Funds will be awarded through annual competition and successful proposals will meet an established set of criteria, including:

- Identification of mission criticality, agency priorities, technical feasibility, stakeholder interest, and research and operational objectives;
- Detailed milestones and performance metrics and assurance of operational/legal/statutory compliance; and
- Identification of a "pathway" for funding routine application or ongoing operations and

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<sup>18</sup> TRLs are usually defined as 1-9, with TRL 1 described as simple the observation or reporting of basic principles, and TRL 9 representing actual successful operations of the technology.

maintenance once transition is complete, including sunset of activities that are no longer critical.

The Office of Science and Technology Policy priorities for FY 2017 direct agencies to strengthen the scientific basis for decision making and to transform research results and technologies to new products and services. These priorities capture NOAA's intent to increase the number and pace of maturing scientific and technological capabilities that transition from research and development to applications. Without transitioning new capabilities from R&D, NOAA cannot ensure communities and businesses have the necessary information, products, or services to prepare for and prosper in a changing environment. Improving NOAA's capacity to leverage the results of R&D into socially, economically valuable applications is a priority of the NOAA Administrator, the Commerce Secretary, and the entire Administration.

**Background information:**

In order for any transition to occur, two phases must be successful: demonstration and deployment. Demonstration is part of R&D (e.g., the use of test-beds to confirm operational usability or demonstration using rapid prototyping), while deployment is part of operations (e.g., the integration of new information or equipment into an operational or management environment). Before any successful transition of technologies and products occur the new technology must be demonstrated in a 'proof of concept' and direct comparison mode against present technology. Transition progress can be monitored using Technology Readiness Levels (TRLs).

Research

TRL 1: Basic principles observed and reported

Development

TRL 2: Technology concept and/or application formulated

TRL 3: Analytical and experimental critical function and/or characteristic proof-of-concept

Demonstration

TRL 4: Component/subsystem validation in laboratory environment

TRL 5: System/subsystem/component validation in relevant environment

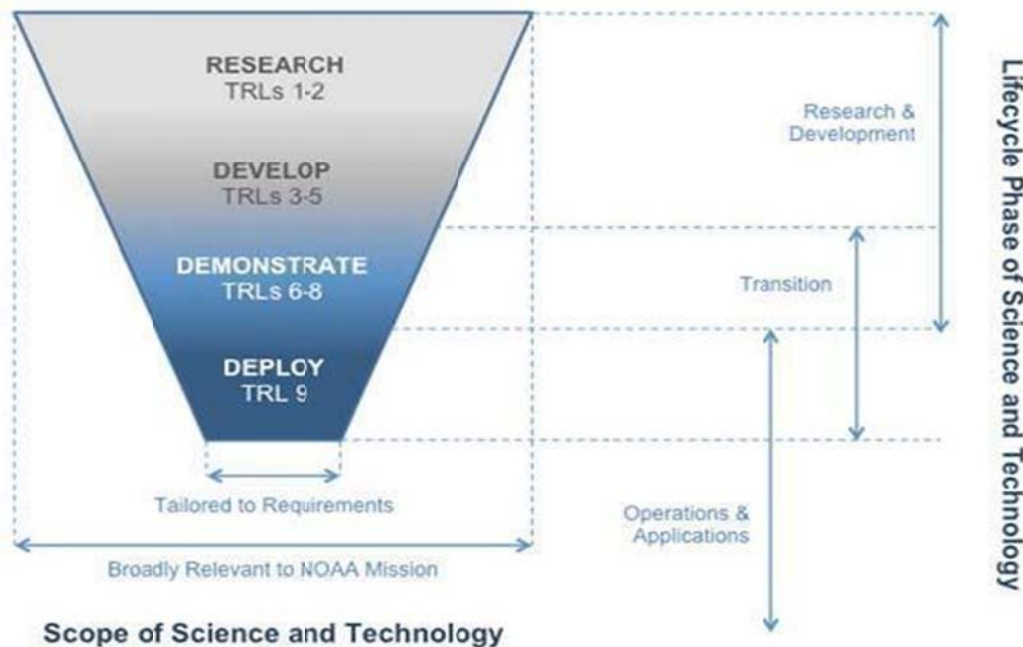
TRL 6: System/subsystem model or prototyping demonstration in a relevant end-to-end environment

TRL 7: System prototyping demonstration in an operational environment

TRL 8: Actual system completed and "mission qualified" through test and demonstration in an operational environment

Deployment

TRL 9: Actual system "mission proven" through successful mission operations



Concepts illustrating phased resource allocation and evolution from research to operations are shown above.

**Statement of Need and Economic Benefits:**

NOAA is a science-based services agency with a R&D portfolio that underpins its core functions, such as weather forecasting and fisheries management. Continually improving NOAA’s products and services to enhance public safety, maximize economic opportunity, and meet other needs of the Nation is an integral part of the R&D enterprise. These improvements occur by developing the most promising research, including new or improved observing, modeling and information technologies to the point that they can ultimately be transitioned into operational use, commercial use, or both.

Key examples of where NOAA has successfully transitioned research results into operations or commercialization include:

- In the 10 years following NEXRAD’s (NOAA’s Next Generation Radar originating in NOAA’s R&D units) full implementation in 1998, NEXRAD reduced deaths by 34 percent and injuries by 45 percent, saving the Nation almost \$3.2 billion.<sup>19</sup>
- Following a 7.5 magnitude earthquake near the Aleutian Islands in November 2003, the NWS Pacific Tsunami Warning Center issued a tsunami watch in Hawaii and Alaska. Data from DART buoys (developed by N units and transitioned to operations) showed the wave was not significant, and no warning was issued, thus saving Hawaii more than \$68 million in evacuation costs.<sup>20</sup>
- Successful transition of bycatch reduction technology in the most abundant commercial fish species on the West Coast, Pacific hake, allowed for up to 80

<sup>19</sup> Simmons, K.M., and D. Sutter. (2011). Economic and Societal Impacts of Tornadoes. Boston, MA: American Meteorological Society.

<sup>20</sup> Meinig, C., Stalin, S.E., Nakamura, A.I. and H.B. Milburn. (2005, June 4). Real-Time Deep-Ocean Tsunami Measuring, Monitoring, and Reporting System: The NOAA DART II Description and Disclosure. Seattle, WA: NOAA’s Pacific Marine Environmental Laboratory

percent of ESA-endangered Chinook salmon to pass through trawl nets, via escapement panels, while still retaining hake, thus achieving the marine-resource protection goal and averting the regulatory closure of the fishery, valued at \$20.6 million, in 2013<sup>21</sup>.

- NOAA researchers at the Pacific Marine Environmental Laboratory (PMEL) developed a system for reporting high resolution ocean pressures near real time for the purposes of tsunami monitoring. Following the devastating Indonesian tsunami in 2004, the PMEL system, known as DART, was patented (US 7,289, 907) and successfully transferred to SAIC corporation to manufacture and distribute under license. This public/private partnership now underpins the NOAA Tsunami Warning System.
- The High Resolution Rapid Refresh Model, developed by NOAA's R&D units and transitioned to operations in 2014, delivers improved predictions of quickly developing severe weather events including thunderstorms, winter storms and aviation hazards such as clear air turbulence. The model updates every hour with a new forecast extending out 18 hours for North America. Such forecasts are especially important in aviation, where fast-developing weather conditions can affect safety and efficiency, but they are equally important for severe weather and energy-related forecasting.

#### **Resource Assessment:**

This is a new initiative and does not have current funding.

#### **Schedule and Milestones:**

FY 2017:

- Conduct semi-annual reviews of funded projects
- Competitively select and fund selected demonstration projects
- Fully populated R&D project database and management system with transition projects
- 4-5 projects complete transition to TRL8

FY 2018 - 2021:

- Conduct semi-annual reviews of funded projects.
- Competitively select and fund selected demonstration projects
- Monitor projects status via the R&D database
- Continue commercial assessments and Intellectual Property protection, as needed
- Ramp up to annual average of 5 projects completing transition to TRL8

#### **Deliverables:**

- Accelerated transition of critical technologies, model improvements, and service applications to NOAA's operational entities and to commercial partners
- More effective management of the R&D projects portfolio with the ability to track the performance and stage/RL of each R&D project as it is transitioned into operations/application

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<sup>21</sup> Efforts to reduce Chinook salmon (*Oncorhynchus tshawytscha*) and rockfish (*Sebastes spp.*) bycatch in the U.S. west coast Pacific hake (*Merluccius productus*) fishery. Lomeli, M.J.M, and W.W. Wakefield. Fisheries Research. 05/2012; vol 119-120:128-132.

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Percent of projects that increase technical readiness	<b>FY 2015 Target</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	15	30	50	70	70
<b>Without Increase</b>	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Description:</b> This measure tracks the proportion of transition projects that have increased the maturity of a technology by at least one degree of technical readiness (e.g., from TRL 5 to 6) over the course of a year. The total number of transition projects is the number of current projects at TRL 5 and above.							

<b>Performance Measure:</b> Percent of transition projects that are tested/ demonstrated in an operational environment	<b>FY 2015 Target</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	10	15	20	30	30
<b>Without Increase</b>	5	5	5	5	5	5	5
<b>Description:</b> This measure is the proportion of transition projects that achieve TRL 8 over the course of the year. This marks the end of the demonstration phase and when projects are approved by the user/operator. Systems are ready for deployment (TRL9), though they may not have yet been adopted by operations. The total number of transition projects is the number of current projects at TRL 4 and above.							

<b>Performance Measure:</b> Number of New Inventions Disclosed	<b>FY 2015 Target</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	20	30	35	35	35
<b>Without Increase</b>	14	15	15	15	15	15	15
<b>Description:</b> The invention disclosure form establishes rights for both the inventor(s) and the U.S. Government for any new technologies. The disclosure of a new invention also initiates the transferring/licensing NOAA technology to commercial use (R2C) process for NOAA.							

## PROGRAM CHANGE PERSONNEL DETAIL

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Innovative Research and Technology  
**Program Change:** Research Transition Acceleration Program

Title:	Location	Grade	Number of Positions	Annual Salary	Total Salaries
Program Analyst	Silver Spring, MD	ZA-IV	1	92,004	92,004
Program Manager	Silver Spring, MD	ZP-V	1	127,886	127,886
Subtotal			2		\$219,890
Less Lapse	25%		0		(\$54,973)
Total Full-time permanent:			2		\$164,917
2017 Pay Adjustment	1.6%				\$2,639
<b>TOTAL</b>			2		\$167,556
<b>Personnel Data</b>			<b>Number</b>		
Full-time Equivalent Employment					
Full-time permanent			2		
Other than full-time permanent			0		
<b>Total</b>			2		
Authorized Positions:					
Full-time permanent			2		
Other than full-time permanent			0		
<b>Total</b>			2		

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** Innovative Research and Technology  
**Program Change:** Research Transition Acceleration Program

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$168	\$168
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>\$168</u>	<u>\$168</u>
12	Civilian personnel benefits	81	81
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	59	59
22	Transportation of things	0	0
23.1	Rental payments to GSA	22	22
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and misc charges	2	2
24	Printing and reproduction	7	7
25.1	Advisory and assistance services	0	0
25.2	Other services	21	21
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	21	21
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	9,619	9,619
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>10,000</u>	<u>10,000</u>

Due to financial system limitations, the object class detail for the Program reflects the Innovative Research and Technology PPA.

**APPROPRIATION ACCOUNT: PROCUREMENT, ACQUISITION, AND CONSTRUCTION  
SUB-PROGRAM: OAR SYSTEMS ACQUISITION**

**RESEARCH SUPERCOMPUTING**

Systems Acquisition provides sustained capability to the NOAA Research and Development (R&D) High Performance Computing System (HPC) to advance Earth system science and accelerate the development of regional and sub-regional information products and services as described in the NOAA High Performance Computing Strategic Plan 2015-2010.<sup>22</sup>

NOAA's R&D HPC provides computational resources to support advances in environmental modeling crucial for understanding critical Earth system modeling issues. This investment includes the supercomputing systems, associated storage devices, advanced data communications, hardware and software engineering services, security, and necessary data center space.

NOAA's R&D HPC also provides software engineering support and associated tools to re-architect NOAA's applications to run efficiently on next generation fine-grain HPC architectures. Through a focused effort, engineers investigate and test new algorithms, train existing NOAA developers with new coding techniques, and assist these developers in accelerating the re-architecting of NOAA's applications. These software engineering efforts allow NOAA to take advantage of next-generation research computing technologies, but also help NOAA to more efficiently use its existing high performance computing assets.

**Schedule and Milestone Highlights:**

FY 2017

- Delivery and acceptance of Gaea replacement system, complete migration of major applications, and migrate minor applications to perform in balance with major applications

FY2018

- High-resolution Earth System Model integrations publicly available for use in regional decision-making through federated data services
- Exploratory application of Earth System Models using exascale high-performance computing platforms, which would be capable of at least one exaflop, or a thousand petaflops

FY 2019

- High-resolution integrations for prediction of seasonal tornado risks at multi-month lead times

FY 2021

- Demonstration of production Earth System modeling applications using exascale computing systems

**Deliverable Highlights:**

- Maintain 96% System Availability of the NOAA R&D HPC
- Improved credibility of projections of changes of important climatic quantities, such as regional climate change and extreme events, to allow society to efficiently plan for and

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<sup>22</sup> [http://www.cio.noaa.gov/it\\_plans/HPCStrategy\\_Final\\_Draft\\_080913.pdf](http://www.cio.noaa.gov/it_plans/HPCStrategy_Final_Draft_080913.pdf)



adapt to climate change

- Major contributions of model data to the Program for Climate Model Diagnosis and Inter-comparison, in support of national and international climate assessments
- Capability to develop and provide decadal prototype forecasts and predictions made with high-resolution coupled climate model
- NOAA’s environmental modeling applications able to utilize performance increases available through fine-grain architectures

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Maintain High Performance Computing / R&D System Availability	99%	96%	96%	96%	96%	96%	96%

**Description:** Maintaining high system availability translates into providing NOAA scientists, researchers, and collaboration partners with the maximum number of computational hours available enabling them to conduct important R&D on an almost 24/7 basis. The HPC program provides NOAA researchers with a reliable computing resource that allows them to plan, with a high degree of confidence, their project milestones and deliverables. System outages can adversely affect NOAA initiatives such as meeting the Intergovernmental Panel on Climate Change milestones or cause delays in implementing operational improvements for hurricane track and intensity predictions. Ensuring high system availability enables NOAA to maximize its investment in these resources.

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Increase percent of codes ported to fine-grain architectures in NOAA’s model suite	0%	15%	30%	60%	80%	100%	100%

**Description:** NOAA models are currently written to maximize efficiency on scalar computer architectures. It is expected that architectures based on fine-grained computing technologies will be replacing current architectures in the near future. NOAA must prepare mission critical applications to efficiently execute on next generation HPC architectures while maintaining performance levels on the current HPC. This performance measure tracks the re-coding of these applications to run on fine-grained architectures.

## **PROGRAM CHANGES FOR FY 2017:**

**Research Supercomputing: Research & Development High Performance Computing Recapitalization (Base Funding: \$20,079,000 and 0 FTE; Program Change: +\$6,300,000 and 0 FTE):** NOAA requests an increase of \$6,300,000 and 0 FTE for a total of \$26,379,000 and 0 FTE to continue the recapitalization of its research and development (R&D) High Performance Computing (HPC) infrastructure.

### **Proposed Actions:**

The NOAA R&D supercomputer (Gaea) located at the Department of Energy's (DOE) Oak Ridge National Laboratory (ORNL) in Oak Ridge, Tennessee will be at the end of its useful life in 2016. NOAA previously made the decision to make the transition to a sustainable funding model for R&D HPC. The new funding model will provide stable computing capacity for NOAA's weather and climate research.

The FY 2017 request builds upon the FY 2016 request to help sustain NOAA's R&D HPC capacity. The FY 2016 President's Budget enabled NOAA to begin the recapitalization of Gaea. The proposed increase in FY 2017 will establish a permanent source of funding to allow regular refresh and recapitalization of this R&D HPC resource via leasing mechanisms. The requested funding will enable greater certainty and longer lead times for planning and executing NOAA's long term environmental modeling activities. In addition, recapitalizing the HPC systems through leasing shifts the burden of future equipment obsolescence to the service provider.

The Office of Science and Technology Policy priorities for FY 2017 direct agencies to include innovation in high-performance computing for modeling and simulation to enhance scientific discovery and economic competitiveness. The President's Executive Order establishing the National Strategic Computing Initiative (NSCI) explicitly calls out NOAA as a deployment agency whose mission requires enhanced HPC, and DOE as a Lead Agency for pioneering advanced HPC systems. The planned recapitalization of Gaea aligns with the NSCI by leveraging NOAA's partnership with DOE/ORNL, where Gaea is sited. This strategy will accelerate scientific discovery in direct support of NOAA's weather and climate missions.

### **Statement of Need and Economic Benefits:**

NOAA's environmental modeling enterprise underpins most of the products and services it provides to the Nation. NOAA's R&D HPC assets are part of the critical infrastructure required for NOAA to accomplish its mission. There is a growing HPC user base in the geospatial and ecosystems research communities within NOAA. FY 2013 marked the first year that every NOAA line office used R&D HPC systems.

Several reports (e.g., the [Federal Plan for High-End Computing](#)<sup>23</sup> and [A National Strategy for Advancing Climate Modeling from the National Research Council](#))<sup>24</sup> recommend the U.S. adopt a high-performance computing strategy that promotes tiers of performance. NOAA's current

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<sup>23</sup> High-End Computing Revitalization Task Force. Federal Plan for High-end Computing. Executive Office of the President, Office of Science and Technology Policy, 2004.

<sup>24</sup> National Research Council. A National Strategy for Advancing Climate Modeling. The National Academies Press, 2012.

R&D HPC systems, Gaea and Zeus, were purchased under the American Recovery and Reinvestment Act (ARRA) of 2009, through a collaborative partnership between NOAA and DOE. Zeus is being recapitalized as part of the Disaster Relief Appropriations Act, 2013. While NOAA's research community has benefited from these emergency supplemental funding sources, they are not a sustainable, efficient way to provide HPC capacity. The computing is able to meet the short term needs of some programs, but large capital purchases open NOAA to the risk of reduced computing capability when these systems require costly maintenance at the end of their lives or NOAA must procure additional HPC capability without new funding.

With this increase, increased capacity on a refreshed R&D HPC system will advance NOAA's modeling capability by:

- Increasing model resolution for more accurate representation of physical processes, dynamics, and advanced data assimilation techniques. This will improve NOAA's regional and local predictions of severe weather, extreme events including floods and drought, and seasonal climate variability.
- Using sophisticated representations of nature in NOAA models to include fully interactive chemistry and aerosols in high-resolution coupled models to better understand and predict the impact of pollution on human health, ocean acidification, and the recovery of the stratospheric ozone layer.
- Expanding ensemble-based prediction systems to reduce forecast uncertainty.

**Resource Assessment:**

The current resources for this activity are described in the Research Supercomputing narrative.

**Schedule and Milestone Highlights:**

FY 2017

- Delivery and acceptance of Gaea replacement system, including additional capacity for sea level rise work

FY 2018

- Begin planning process for replacement of Theia (Zeus replacement) system in Fairmont, West Virginia

FY 2019

- Begin planning for tech refresh of Gaea

FY 2020

- Delivery and acceptance of Theia replacement

FY 2021

- Delivery of tech refresh for Gaea system

**Deliverable Highlights:**

- High-resolution (3-10 km) ocean models accounting for ocean eddy circulations, ocean-ice interactions and global and regional sea-level rise
- High-resolution (1-3km) storm-resolving regional models embedded in coarse resolution (15km) global models
- Coupled climate models using state-of-the-art atmosphere, ocean, biosphere, and cryosphere components to accelerate the delivery of high-resolution regional climate information
- Fully interactive atmospheric chemistry, aerosol, and cloud physics in high-resolution coupled models

- Complete biogeochemical cycle modeling (e.g., for nitrogen and phosphorous) with improved representation of open ocean and coastal mechanisms

#### Performance Goals and Measurement Data

<b>Performance Measure:</b> Improving model performance, understanding of uncertainties, and confidence in climate change projections and predictions. (Number of Key Physical Processes)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	3	3	4	5	6
<b>Without Increase</b>	3	3	3	3	3	3	3
<b>Description:</b> Increased HPC capacity will allow models to be run with greater complexity and at greater resolution. This will improve the treatment of key physical processes, including cloud formation and precipitation in climate models to reflect greater confident projections of key climate change impacts. Inputs to this cumulative index are (1) Improved cloud and water vapor observations; (2) improved aerosol precipitation susceptibility index; (3) improved parameterizations and modeling of clouds, aerosols, and water vapor; and (4) number of products transitioned that include new parameterizations.							

<b>Performance Measure:</b> Expand number of new seasonal-to- decadal prototype forecasts and predictions for global-to-regional scales (Cumulative number of Forecasts)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	3	4	6	8	10
<b>Without Increase</b>	1	2	3	4	5	6	7
<b>Description:</b> Increased HPC capacity will allow models to be run at greater resolution and with new data assimilation schemes. Running the models at high resolution will improve their representation of seasonal-to-decadal predictability. This will result in an expanded number of seasonal-to-decadal prototype forecasts made with the high resolution coupled climate model.							

<b>Performance Measure:</b> Reduce 10-day wind forecast error (baseline FY 2013)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	3%	3%	10%	10%	10%
<b>Without Increase</b>	3%	3%	3%	3%	3%	3%	3%
<b>Description:</b> Increased HPC capacity will allow weather models to run at higher resolution and to assimilate more data, which will result in reduced forecast error. Understanding these winds at upper (250mb) and lower (850mb) levels of the atmosphere is important to aviation forecasting. Forecasting winds at these levels is also important for winter storm and tropical storm prediction. These wind metrics would be applied in the northern and southern hemispheres and in the tropics. They would be compared against both gridded analysis data and against weather observations such as from radiosondes.							

**Outyear Funding Estimates (\$ in Thousands)**

<b>Research Supercomputing</b>	<b>FY 2016 &amp; Prior</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC</b>	<b>Total</b>
<b>Change from FY 2017 Base</b>		6,300	8,000	12,000	12,000	12,000		
<b>Total Request</b>	339,144	26,379	30,379	34,379	34,379	34,379	N/A	Recurring

Out years are estimates only. Future requests will be determined through the annual budget process.

\*Includes Disaster Relief Appropriations Act, 2013

\*\*Includes American Recovery and Reinvestment Act (ARRA) of 2009

CTC = cost to complete

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Office of Oceanic and Atmospheric Research  
**Sub-program:** OAR System Acquisition  
**Program Change:** Research & Development High Performance Computing Recapitalization

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>\$0</u>	<u>\$0</u>
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and misc charges	0	1,270
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	6,477
25.3	Purchases of goods & services from Gov't accounts	0	3,186
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	129
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	687
31	Equipment	6,300	14,035
32	Lands and structures	0	595
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>6,300</u>	<u>26,379</u>

## **BUDGET PROGRAM: NATIONAL WEATHER SERVICE**

For FY 2017, NOAA requests a total of \$1,119,292,000 and 4,549 FTE for the National Weather Service, including a net decrease of \$18,551,000 and 89 FTE in program changes.

### **National Weather Service Overview**

The National Weather Service (NWS) (<http://www.weather.gov/>) provides weather, water, and climate forecasts and warnings for the United States, its territories, adjacent waters, and ocean areas for the protection of life and property and the enhancement of the national economy. During life-threatening weather situations, NWS is the United States' sole authoritative source for warnings. NWS forecasters also issue a variety of forecasts and warnings every day, covering public, aviation, marine, fire, weather, climate, space weather, rivers and floods. NWS data and products form a national information database and infrastructure used by the public, other governmental agencies, the private sector, and the global community.

The FY 2017 budget submission continues to strive to make the United States a Weather-Ready Nation (WRN). To support this, NWS is evolving into an organization capable of change and innovation leading to a fully integrated field structure issuing consistent products and services. As these changes are implemented, the NWS will better support public and private users, including emergency managers and businesses, to make faster, smarter decisions that save lives and protect livelihoods. NWS' evolution is guided by the National Academy of Sciences, "*Becoming Second to None*," and the National Academy of Public Administration (NAPA), "*Forecast for the Future: Assuring the Capacity of the NWS*" reports.

The NWS is organized into five Operations, Research, and Facilities (ORF) sub-programs/Programs, Projects, and Activities (PPA) totaling \$1,002,528,000 and 4,616 FTE.

- Observations (\$234,483,000 and 933 FTE) supports the observing systems which collect data necessary to provide weather forecasts, warnings, and outlooks, such as the Next Generation Weather Radar (NEXRAD), the Automated Surface Observing System (ASOS), and Radiosondes.
- Central Processing (\$93,357,000 and 232 FTE) supports the information technology (IT) necessary to process weather data and run weather models in support of national centers and field operations including the Weather and Climate Operational Supercomputing System (WCROSS), the Advanced Weather Interactive Processing System (AWIPS), and hydrology information technology initiatives.
- Analyze, Forecast, and Support (\$490,617,000 and 2,899 FTE) supports a distributed network of Weather Forecast Offices (WFO) and specialized centers comprising a workforce of meteorologists, hydrologists, climatologists, and space physicists, whose expertise takes observation data and model outputs and in turn provide up-to-date and accurate weather forecasts, warnings, and outlooks to the Nation.
- Dissemination (\$45,236,000 and 82 FTE) supports operations of the communication infrastructure, such as the Telecommunications Gateway and NOAA Weather Radio, required for distributing those forecasts, warnings, and other products to customers and partners and the American public.
- Science and Technology Integration (\$138,835,000 and 470 FTE) supports research and research to operation activities that advance weather and climate prediction and improve NWS product and information in the future.

The NWS is organized into two Procurement, Acquisition, and Construction (PAC) sub-programs and four PPAs totaling \$135,315,000 and 22 FTE:

- Systems Acquisition:
  - Observations (\$16,720,000 and 0 FTE) supports enhancement and life-cycle replacement of systems collecting and processing observations necessary to provide weather forecasts, warnings, and outlooks, such as the Next Generation Radar (NEXRAD).
  - Central Processing (\$64,261,000 and 22 FTE) provides operational and developmental high performance computing (HPC) capacity and forecast and process improvements within AWIPS
  - Dissemination (\$45,684,000 and 0 FTE) enhances infrastructure and expands capacity of NWS dissemination systems to meet new satellite and model data requirements, including the Telecommunications Gateway and upgrading select NOAA Weather Radio locations.
- Construction:
  - Facilities Construction & Major Repairs (\$8,650,000 and 0 FTE) includes upgrades and improvements to NOAA's Forecast Offices and facilities.

NWS forecasts, predicts, provides outlooks, and communicates effects of changing weather, climate, and water to the American public. Weather and water impact every sector of the economy, and businesses rely on NOAA's information to improve commerce. Accurate information, including timely and accurate warnings for weather-related hazards, is also necessary for public safety. In turn, NWS measures satisfaction with NOAA information and warning services, through surveys of emergency managers, first responders, natural resource and water managers, public health professionals, industry, government and the public. NWS then uses these results to inform service improvements.

NWS will enhance observation capabilities by: (1) improving data assimilation that effectively uses all relevant data collected by NWS and others; (2) improving research community collaboration through creative approaches such as community modeling by rapidly transforming scientific advances in modeling into improved operational products; (3) improving the techniques used by our expert forecasters; (4) making NWS information available quickly, efficiently, and in a useful form such as the National Digital Forecast Database; (5) incorporating forecast uncertainty to help customers make better-informed decisions; (6) leveraging emerging technologies to disseminate this information; and (7) maintaining an up-to-date technology base and a trained workforce to integrate these tools to maximum effect.

NWS operates and maintains critical infrastructure, which enables the provision of NOAA's services to the Nation. NWS manages a distributed network of offices that span the United States and its territories, delivering essential NOAA services, especially those related to high-impact events, at the local level where critical, life-saving decisions are made. This includes the management of all major weather observing systems, from software engineering and communications to facilities and logistics planning. NWS also ensures worldwide acquisition and delivery of weather and water data through the Telecommunications Gateway and the one NWS network. In support of NOAA's operational forecasting mission, NWS develops, improves and monitors data assimilation systems and models of the atmosphere and oceans, using advanced methods developed internally as well as cooperatively with scientists from universities, NOAA laboratories, other government agencies, and the international scientific community.



In accordance with NOAA's strategic vision, NWS launched its WRN initiative to build community resilience in the face of increasing vulnerability to extreme weather and water events. The initiative improves support for management of the Nation's water supply, understanding of climate-related risks, economic productivity, and healthy communities and ecosystems. Record-breaking snowfall, cold temperatures, extended drought, high heat, severe flooding, violent tornadoes, and massive hurricanes have all combined to cause frequent multi-billion dollar weather disasters. The devastating impacts of extreme events can be reduced through improved readiness, which is why NWS is reacting with the WRN initiative to further reduce the Nation's weather-related vulnerabilities. The initiative will be enacted through improvements to demand-driven support services, innovative technology, and specialized training of our workforce.

Building a WRN requires the participation and commitment of a vast nationwide network of partners that comprise the weather and water enterprise including other government agencies, emergency managers, researchers, the media, the private sector and more to assess why the Nation is experiencing such extreme impacts. NWS depends on partners including other NOAA line offices to acquire data, conduct research, provide education and training, help disseminate critical environmental information, and provide advice to make best use of NWS information.

**Performance:**

NWS is a customer-oriented government agency that delivers weather forecasts, warnings, and advisories every day that are used by virtually every American. As a professional science-based agency, verification of organizational performance is an integral part of NWS' business process. The effectiveness of NWS investments is assessed using numerous internal and external performance measures including the Government Performance and Results Act (GPRA) goals. These efforts have been institutionalized in NWS operations to maintain quality control and use objective methods to assess NWS performance.

**Performance Goals and Measurement Data:**

<b>Performance Measure</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Tornado Warnings Lead Time, Indicator 3.2b	8	13	13	13	13	13	13
Tornado Warnings Accuracy, Indicator 3.2b	58	72	72	72	72	72	72
Tornado Warnings False Alarm Ratio, Indicator 3.2b	70	71	71	71	71	71	71
Flash Flood Warnings Lead Time, Indicator 3.2c	64	61	63	63	65	65	65
Flash Flood Warnings Lead Accuracy, Indicator 3.2c	79	76	76	76	76	76	76

<b>Performance Measure</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
48 hour Hurricane Track Error in nautical miles, Indicator 3.2d	65*	71	68	65	61	57	54
48 hour Hurricane Intensity Error in knots, Indicator 3.2e	10*	12	12	11	11	11	10
Accuracy (%) (Threat score) of Day 1 precipitation forecasts, Indicator 3.2f	33	32	33	33	33	33	33
Winter Storm Warnings Lead Time, Indicator 3.2g	21	20	20	20	20	20	20
Winter Storm Warnings Accuracy, Indicator 3.2g	85	90	90	90	90	90	90
Marine Wind Speed Forecast Accuracy, Indicator 3.2h	80	75	78	79	79	80	80
Marine Wave Height Forecast Accuracy, Indicator 3.2h	84	76	81	82	82	83	83
Aviation Forecast IFR Accuracy, Indicator 3.2i	65	65	65	65	65	65	65
Aviation Forecast IFR False Alarm Ratio, Indicator 3.2i	34	38	38	38	38	38	38
Geomagnetic Storm Forecast Accuracy, Indicator 3.2j	57	53	40	40	40	40	40
U.S. Seasonal Temp. Forecast Skill, Indicator 3.1e	25	25	26	26	26	26	27

\*These values are for the Calendar Year (CY) 2014 Hurricane Season which spans from June 1, 2014 and ends on November 30, 2014. CY 2015 Hurricane GPRA final values will not be available until late February 2016.

**Significant Inflationary Adjustments:**

NOAA's FY 2017 Base includes a total of \$13,038,000 and 0 FTE to account for the full funding requirement for inflationary adjustments to current programs for NWS activities. This includes the estimated 2017 Federal pay raise of 1.6 percent as well as inflationary increases for non-labor activities, including service contracts, utilities, field office lease payments, and rent charges from the General Service Administration (GSA).

NOAA also requests the following transfers for a net change of \$0 and 0 FTE to the agency.

<b>From Office</b>	<b>PPA</b>	<b>To Office</b>	<b>PPA</b>	<b>Amount</b>
MS	Mission Services and Management	NWS	Analyze, Forecast and Support (ORF)	\$613,000/ 0 FTE
MS	Mission Services and Management	NWS	Dissemination (ORF)	\$43,000/ 0 FTE
NWS	Analyze, Forecast and Support (ORF)	NWS	Observations (ORF)	\$15,050,000/ 129 FTE
NWS	Analyze, Forecast and Support (ORF)	NWS	Science and Technology Integration (ORF)	\$1,500,000/ 0 FTE
NWS	Science and Technology Integration (ORF)	NWS	Analyze, Forecast and Support (ORF)	\$2,750,000/ 18 FTE

NOAA requests to transfer \$501,000 and 0 FTE to move funding for operations at the David Skaggs Research Center in Boulder, CO, from the Mission Support Facilities to NWS. This funding is currently appropriated to the Mission Services and Management PPA and then distributed to the Line and Staff Offices annually. This reallocation will increase efficiencies by eliminating the need for funding transfers subsequent to appropriation and will improve transparency.

NOAA requests to transfer \$155,000 and 0 FTE to move funding associated with NOAA's Western Regional Center (WRC) management activities from Mission Support Facilities to NWS, Analyze, Forecast and Support (ORF). Currently, costs for these activities are paid directly through the funding appropriated to the Mission Services and Management PPA. This reallocation supports NOAA's plan to employ an integrated campus cost model to allocate the cost of services proved to the WRC tenants. The tenants will then be billed directly based on the approved cost model. An integrated cost model will provide greater transparency and a more accurate reflection of program operating costs.

NWS requests a technical adjustment to move \$15,050,000 and 129 FTE from the Analyze, Forecast and Support PPA in ORF to the ORF Observations PPA. This adjustment corrects the misalignment of Observations Program Leads (118 FTE) and Port Meteorological Officers (11 FTE) within the Analyze, Forecast and Support PPA. The transfer is required to properly align these activities with the appropriate PPA, Observations.

NWS requests a technical adjustment to move \$1,500,000 and 0 FTE from the Analyze, Forecast and Support PPA in ORF to the ORF Science and Technology Integration PPA. This adjustment corrects the misalignment of aviation weather forecast improvement activities within the Analyze, Forecast and Support PPA. The transfer is required properly align these activities with the appropriate PPA, Science and Technology Integration.

NWS requests a technical adjustment to move \$2,750,000 and 18 FTE from the Science and Technology Integration in ORF to the ORF Analyze, Forecast and Support PPA. This adjustment corrects the misalignment of Space Weather forecasters (18 FTE) within the Science and Technology Integration PPA. The transfer is required to properly align these activities with the appropriate PPA, Analyze, Forecast and Support.

**APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES**  
**SUB-PROGRAMs: OBSERVATIONS; CENTRAL PROCESSING; ANALYZE, FORECAST**  
**AND SUPPORT; DISSEMINATION; SCIENCE AND TECHNOLOGY INTEGRATION**

The objectives of the sub-programs are to:

- Provide up-to-date and accurate weather forecasts, warnings, and outlooks to the Nation;
- Support the emergency management community;
- Engage in outreach and education activities to support public decisions;
- Maintain the operations of systems that collect observations necessary to provide weather forecasts, warnings, and outlooks to the Nation;
- Maintain processing systems necessary to generate weather forecasts, warnings, and outlooks to the Nation; and
- Improve services by integrating new advances in science and technology.

NWS has nearly 4,600 FTEs in 122 Weather Forecast Offices (WFO), 13 River Forecast Centers (RFC), 9 National Centers for Environmental Prediction (NCEP), and other support offices around the country. NWS supports a national infrastructure to gather and process data worldwide from the land, sea, air and space. This infrastructure collects data from technologies such as Doppler weather radars, satellites operated by NOAA's National Environmental Satellite, Data, and Information Service (NESDIS), marine data buoys, surface observing systems, and instruments for monitoring space weather. These data feed sophisticated models running on high-speed supercomputers. A highly trained and skilled workforce uses powerful workstations to analyze all of these data and issue forecasts and warnings. High-speed communications tie this entire information infrastructure together and disseminate forecasts and warnings to the public.

Trained community volunteers also enhance NWS operations. Cooperative observers collect weather data that become part of the Nation's climate records and citizen storm spotters provide visual confirmation of severe weather events. As environmental information becomes more sophisticated and accessible, the environmental literacy of the public becomes more important. NWS outreach and education activities are aimed at ensuring the public understands NWS' information and effectively integrate it into their decision making.

## **OBSERVATIONS**

NWS is fundamentally dependent on environmental observations from the surface of the sun to the bottom of the sea to meet its forecast and warnings mission. NWS integrates in-situ and remotely-sensed data from satellites and radars, NOAA systems, commercial sources, Federal and even international partners.

In 2015, NWS maintained an average, cross platform buoy data availability rate of 85 percent, a Next Generation Radar (NEXRAD) system availability rate of 99 percent and an ASOS system availability rate of 98 percent. In addition, NWS deployed 15 next generation coastal weather buoy systems to its hurricane buoy network using the Disaster Relief Appropriations Act, 2013. In FY 2017, NWS will continue to maintain its critical observing systems while improving their sustainability through configuration management.

Funding from this PPA is used to operate and maintain all NWS observing systems, evaluate observational requirements, engineer technical solutions, and perform systems development

and testing. Together, these systems enable forecasters to identify emerging threats, characterize their severity, and provide detailed warnings and forecasts.

Observing systems must measure a broad array of parameters to support forecasting in the varied mission service areas of the NWS, including aviation weather, severe weather, space weather, tropical weather, tsunami and more. All of these systems have strengths and weaknesses in monitoring the environment, so individual systems in the overall suite must complement each other. By gathering information from multiple sources, NWS ensures the most complete data picture possible.

Specific activities in the Observations PPA include:

- Manage operations and maintenance of NWS observational systems;
- Provide holistic, on-going assessments/analyses of the observing systems portfolio;
- Identify and validate NWS' observation requirements;
- Seek solutions to fulfill NWS' observation requirements;
- Develop a strategy to maximize effectiveness while minimizing cost; and,
- Coordinate NWS' observing system activities with NOAA and its partners.

To achieve these goals, NWS maintains the following programs:

**Upper Air (UA) Observations Program** provides a vertical profile of meteorological data across the Earth's atmosphere. To provide humidity, pressure, and other data that shape weather forecasts, NWS operates a radiosonde network, acquires observations from private and commercial aircraft, acquires lightning data from commercial vendors, and operates a wind profiler network in Alaska. In addition, the program provides for critical, terrestrial based space weather observations.

- Each year, NWS launches over 78,000 radiosondes from locations throughout the United States and its possessions, including the Caribbean and Pacific Island nations. Radiosondes provide atmospheric profiles of pressure, temperature, relative humidity and winds aloft. These data are critical inputs for NWS weather prediction models and forecaster operations supporting severe storm, aviation and marine forecasts, and climate and other research uses. Radiosondes also serve to provide a reference for satellite sounding data.
- NWS leverages private-public partnerships to obtain lightning and additional data for more comprehensive upper air observations. Meteorological Data, Collection and Reporting System (MDCRS)-equipped aircraft currently provide temperature and wind information.
- The Alaskan NOAA Profiler Network (NPN) consists of three Doppler radar sites providing continuous vertical wind profile data. The most critical use of the Alaska profiler network is to support the production of aviation warnings of volcanic ash, which can cause catastrophic engine failure for aircraft in flight.
- NWS supports the National Solar Observatory's (NSO) Global Oscillation Network Group (GONG) solar observatories. GONG consists of six ground-based observatories strategically placed around the globe, so that at least one site has the opportunity to observe the Sun at all times in support of NWS' space weather mission.

**Radar Observations Program** provides meteorological data about clouds and precipitation that can predict storm impacts and severity. To produce timely and accurate storm data, NWS operates 122 NEXRADs and acquires supplementary radar data from other sources.

- NEXRAD is a tri-agency weather radar system with NWS, the Department of Defense (DOD) and Federal Aviation Administration (FAA). NEXRAD is the primary tool used by

NOAA's meteorologists for issuing warnings for flash floods, tornadoes, and severe thunderstorms.

- NWS leverages other radar data sources such as the FAA's Terminal Doppler Weather Radar (TDWR) to supplement the NEXRAD network to ensure adequate national radar coverage.

**Surface Observations Program** provides meteorological data at the Earth's surface. To provide on-the-ground observations, NWS operates the Automated Surface Observing System (ASOS), the Cooperative Observer Program (COOP) and the National Mesonet Program.

- ASOS is the Nation's primary surface weather observing network supporting aviation operations and the needs of the meteorological, hydrological, and climatological research communities. ASOS is a tri-agency automated surface observation system with NWS, FAA, and DOD and consists of 992 operational systems.
- COOP is a network of volunteer observers providing a significant and cost effective source of meteorological and climatological data representative of where our citizens live, work, and play. The COOP data are the primary data utilized in the NWS snowfall forecast guidance.
- The National Mesonet is a network of automated weather stations installed closely together in order to gather "mesoscale meteorological" observations such as temperature, humidity, and atmospheric pressure. Due to their proximity to each other, Mesonet data can identify small scale features at the surface which can indicate rapidly deteriorating weather conditions which are not shown by other observations.

**Marine Observations Program** provides real-time meteorological, climatological and tsunami data in the open ocean and coastal zones surrounding the United States. NWS operates the Weather and Ocean Platform network, the Tropical Atmosphere Ocean (TAO) Array and the Deep-ocean Assessment and Reporting of Tsunamis (DART®) stations.

- The Weather and Ocean Platform is a network of 149 meteorological and ocean observing platforms located in the coastal and offshore waters around the U.S. to provide real-time marine meteorological, oceanographic and geophysical observations. The network includes 101 moored Coastal Weather Buoys (CWB) and 48 land-based Coastal Marine Automated Networks (C-MAN) stations. This network provides forecasters and the public with frequent, high-quality marine observations for forecast and warning preparation and to verify forecasts after they are produced.
- The TAO array is designed for the study of seasonal and year-to-year climatic variations related to El Niño and the Southern Oscillation (ENSO). The array consists of 55 moored ocean buoys and four Acoustic Doppler Current Profilers (ADCP) in the equatorial Pacific.
- DART® stations, located largely along the 'ring of fire' throughout the Pacific Ocean, Atlantic Ocean, Caribbean Sea and Gulf of Mexico, collect observational data which is used by NWS' Tsunami Warning Centers to prepare and refine tsunami watches and warnings covering all U.S. territories and coastal states.
- NWS supports the maintenance of a number of the tsunami-capable tide gauges operated by both the NOS Center for Operational Oceanographic Products and Services (CO-OPS), and the University of Hawaii Sea Level Network. These sensors provide the NWS Tsunami Warning Centers with coastal water-level information updated every minute in key tsunami threat regions. NWS also supports maintenance of a number of coastal sea-level gauges and seismic networks to support tsunami detection, forecast and warning.

**Systems Engineering and Support** provides systems acquisition, engineering and logistics support for NWS mission critical observing systems as well as functional expertise necessary to design, acquire, test and provide life cycle support. Actions include:

- Perform system engineering and acquisition to support operational weather systems;
- Plan, coordinate, and implement hardware modifications, retrofits and rehabilitation programs to meet changing program requirements and improving system performance;
- Direct product identification, configuration control, auditing, and status accounting for all systems that are under formal NWS Configuration Management control;
- Prescribe and manage efficient logistics stocking levels and ensuring procurement of initial and replenishment spares for depot-level stock;
- Provide maintenance, repair, quality assurance, and warehousing of new and reconditioned parts;
- Develop and maintaining software for Surface and Upper Air systems; and,
- Perform system and operational tests and evaluation of alternative systems.

### **Schedule and Milestones:**

FY 2017 – 2021

- Acquire additional water vapor data via aircraft observation
- Maintain the tri-agency NEXRAD radar network
- Maintain the tri-agency ASOS system
- Maintain National Mesonet Program Office
- Operate and maintain weather/ocean buoy, C-MAN, DART stations and TAO array
- Sustain data processing of the National Solar Observatory's Global Oscillation Network Group (GONG) and observatory support
- Sustain critical observing system networks and the operations and maintenance of (tsunami-reporting) seismic sensors and sea-level stations
- Improve and maintain paperless reporting of COOP data
- Deploy NEXRAD Radar Product Generator (RPG) and Radar Data Acquisition (RDA) Software Builds
- Develop and test NEXRAD RPG and RDA Software Builds
- Develop, test, and deploy TDWR SPG Builds
- Develop, test, and deploy NOAA Profiler Network Software Builds

### **Deliverables:**

- Support operations of 102 radiosonde stations in the United States and possessions, Caribbean, and Pacific Island nations
- Support operations of three Wind Profiler systems in Alaska
- Support operations of 122 NEXRAD systems at 96 percent availability
- Support operations of 45 TDWR Supplemental Product Generator (SPG) systems
- Support operations of 312 NWS ASOS units and maintenance of 570 FAA ASOS units under a reimbursable funding arrangement
- 500 Wireless Temperature Systems on shelf at NLSC with deployment criteria
- 100 Soil Temperature Systems on shelf at NLSC with deployment criteria
- Paperless COOP data reporting system online within NWS IT infrastructure
- Hourly marine weather wind speed and direction, air and sea temperature, atmospheric pressure, and detailed wave information
- Support operations of 39 DART® with data availability of 80 percent
- Support operations of the TAO buoy array at 80 percent data availability (assumes adequate ship time provided by OMAO)
- Support operations of 101 CWB systems at 80 percent data availability (assumes adequate ship time provided by the U.S. Coast Guard)
- Support operations of 47 C-MAN stations at 80 percent data availability



- Continuity of GONG data to the Space Weather Prediction Center

## **CENTRAL PROCESSING**

Central Processing is the next step in the NWS forecast process. Through this PPA, NWS ingests data obtained from observing infrastructure, and delivers it in a usable form to NWS modelers and meteorologists. Activities include managing the Weather and Climate Operational Supercomputing System (WCOSS), AWIPS, hydrology information technology initiatives, and the IT infrastructure which support national centers and field operations. Together these ensure the uninterrupted flow of information from collection of observations to central guidance production and local access to all essential weather and climate data products.

In 2015, NWS completed the deployment of AWIPS II. AWIPS II is an underlying software design enhancement which will enable the AWIPS software – NWS' primary forecasting software – to more rapidly integrate new data sources and forecast capabilities into operations while improving system maintainability. In 2017, NWS will continue to integrate new forecast capabilities into AWIPS and model improvements onto WCOSS.

In general, activities in the Central Processing portfolio include:

- Operate NWS' IT processing infrastructure;
- Identify NWS' processing requirements and gaps;
- Review NWS' processing system capabilities;
- Seek solutions to fulfill NWS processing requirements;
- Coordinate NWS' processing system activities across NOAA; and,
- Maintain a 24/7 help desk for all forecast systems.

To achieve these goals, NWS maintains the following programs:

**National Centers for Environmental Prediction (NCEP) Central Operations (NCO)** provides support for WCOSS including the software and infrastructure which forms the basis for predictions from NCEP Centers and WFOs through its Weather and Climate Computing Infrastructure Services (WCCIS) program. WCCIS provides the following services:

- Performs quality assurance of incoming observations and outgoing products;
- Transitions and disseminates numerical weather and climate prediction models from development into operational use by forecasters at NCEP and the WFOs;
- Performs 24/7 system maintenance and administration service;
- Performs software development for data processing, display, interaction, and product generation; and,
- Monitors the creation of all products in the NCEP production suite on a 24/7 basis.

**AWIPS** is the information processing, display, and telecommunications system that is the cornerstone of NWS field operations. AWIPS provides the following services:

- Integrates and displays observing data (meteorological, hydrological, satellite, and radar) at NWS field offices;
- Process and displays data at operational sites;
- Provides an interactive communications system to connect NWS field locations;
- Initiates the dissemination of weather and flood warnings and forecasts in a rapid and highly reliable manner; and,
- Provides the communication interface for the public to see NOAA's data.

**Hydrology Information Technology Initiatives** gather advanced and localized information about water resource concerns including drought and flooding. This includes:

- The Advanced Hydrologic Prediction System (AHPS) is a web-based suite of river-forecast products providing information on the magnitude and likelihood of floods or droughts. In 2017, advanced river forecast information will be provided at 4,011 locations throughout the United States to assist emergency managers, water managers, and the general public in making decisions based on improved forecasts.
- Community Hydrologic Prediction System (CHPS) is the information technology infrastructure that all 13 River Forecast Centers (RFCs) use to access hydrologic models. These tools enable products that community leaders and emergency managers use to effectively respond to flooding events.

**National Centers and Regional IT Infrastructure** maintain information technology infrastructure and standards which enable the National Centers and regional offices, including forecast offices, to effectively work together. This includes:

- Computing that occurs outside of AWIPS
- Local area networking
- Security
- Data center power and cooling

**Schedule and Milestones:**

FY 2017-FY 2021

- Manage HPC usage, reliability, and resources including a major system upgrade
- Support scheduled improvements to NCEP production suite
- Complete AWIPS contract transition
- Deploy updated AWIPS hardware infrastructure at National Centers
- Maintain updated AWIPS architecture at National Centers and WFOs
- Continue to improve flood lead time and accuracy improvement

**Deliverables:**

- WCOSS capacity substantially increased and meeting or exceeding reliability metrics
- 43 million numerical prediction products produced per day for weather, climate, ocean, river, and space-weather forecasts
- AWIPS II program under new competitively bid contract
- 4,011 operational AHPS forecast locations
- AHPS performance meeting or exceeding flood lead time and accuracy goals
- National Center and Regional IT infrastructure that meets operational reliability goals through improved annual maintenance

**ANALYZE, FORECAST, & SUPPORT**

NWS' mission is to provide forecasts and warnings for the protection of life and property. The Analyze, Forecast, and Support (AFS) PPA leverages the work done by the Observations and Central Processing PPAs by applying expertise to the observed data and model to produce forecasts, warnings, and Impact-Based Decision Support Services (IDSS) for the Nation. NWS' weather, water, climate and space weather forecasts and warnings are critical to saving lives and property and enhancing the national economy, making it integral to the creation of a WRN.

NWS' distributed network of forecast offices, specialized centers, and associated workforce of meteorologists, hydrologists, climatologists, and space physicists is supported through the AFS PPA. This expert workforce monitors the weather, water, climate and space from our oceans to the surface of the sun 24 hours a day, seven days a week. Forecasts globally support agriculture, transportation and water management among other missions. Alerts, provided days in advance, of pending winter storms or hurricanes, wildland fire conditions, heat waves or river floods enable the public and emergency managers to plan effective response strategies. Warnings for high impact, rapidly evolving hazards such as solar storms, tornadoes, tsunamis, flash floods or volcanic eruptions enable the public to get out of harm's way and protect their livelihoods.

IDSS is the foundational concept of NWS' creation of a WRN. Rather than developing and transmitting a suite of products at fixed times and expecting stakeholders to fully understand and take appropriate action; IDSS changes the paradigm so information users drive the update frequency and product focus to their specific need. IDSS also enhances decision making and public safety by providing forecasters more flexible opportunities to work with key governmental partners, like being embedded within emergency operations centers. NWS forecasters work with local partners and communities to understand and manage risk, formulate emergency response plans and promote community resiliency and public safety.

In FY 2015, NWS met or exceeded all but two of its GPRA performance measures. In May 2015, NWS achieved Initial Operating Capability (IOC) for the National Water Center (NWC) in Tuscaloosa, Alabama. NWS provided significant decision support services during major weather outbreaks throughout 2015. Notable FY 2015 events include:

- The severe geomagnetic storms of June – NWS' geomagnetic watches accurately predicted the storms' terrestrial onset within four hours. Geomagnetic storms were severe (G4) on the 5-level NOAA Space Weather Scales. NWS' IDSS allowed critical components within the North American electric power grid, U.S. airlines, and users of high precision GPS to effectively plan and mitigate impacts until geomagnetic storming ended on June 23, 2015.
- Record setting New England blizzard of late January – NWS began providing information on potential for this coastal winter storm seven days in advance with specific threat to the Northeast at day five. The winter storm warning accuracy for this event was 98 percent with a 37 hour lead time. WFOs provided consistent messaging and decision support to national, regional, and local media enabling appropriate and timely preparations which contributed to quick recoveries of public utilities, transportation and other services.

In 2017, NWS will expand the NWC's role in providing consistency in hydrologic forecasts. NWS will to develop effective IDSS while improving service delivery performances.

To achieve these goals, NWS maintains the following programs:

**Weather and Climate Services and Warnings** provide real-time meteorological and climatological products to the public. To achieve this requirement, NWS operates WFOs and other field offices within the continental United States, Alaska, Hawaii, and U.S. territories.

- WFOs issue warnings, advisories, statements, and forecasts for their geographic area of responsibility 24/7 at multiple time scales, from immediate threats to monthly climate reports. These forecasts include marine, aviation, fire, severe thunderstorms, flash floods and tornadoes. WFOs control broadcasts of weather information on the NOAA Weather Radio

All Hazards stations, provide weather spotter training to communities and foster close ties with both the media and the emergency management community.

- Weather Service Offices (WSO) are located within Alaska and Pacific Regions and provide expert hydro-meteorological data in support of local, regional, national, and global weather, hydrologic, climatic, and warning programs. WSOs support the mission of their associated WFO through public service, education, and outreach. They differ from WFOs in that they do not issue forecasts, are responsible primarily for observations and data collection, and are not run 24 hours a day.

**National Centers** provide specialized forecast guidance and products for NWS field offices and other direct users through NCEP. Each National Center depends on NWS observations and central processing work to provide expert analysis and prediction services to the local WFO infrastructure. The National Centers provide an integrated suite of weather and environmental forecast guidance at various time frames to the WFOs, such as model outputs. Forecasters use this guidance as the basis for consistent local forecast products, advisories and warnings. The AFS PPA supports seven National Centers:

- Aviation Weather Center (AWC) delivers consistent, timely and accurate weather information for the world airspace system.
- Climate Prediction Center (CPC) delivers real-time products and information that predict and describe climate variations on timescales from weeks to years thereby promoting effective management of climate risk and a climate-resilient society.
- National Hurricane Center (NHC) issues watches, warnings, forecasts and analyses of hazardous tropical weather, and increases understanding of these hazards.
- Ocean Prediction Center (OPC) issues marine warnings, forecasts, and guidance for maritime users and continually monitors and analyzes maritime data for protection of life and property, safety at sea, and enhancement of economic opportunity.
- Space Weather Prediction Center (SWPC) provides real-time monitoring and forecasting of solar and geophysical events and disturbances.
- Storm Prediction Center (SPC) provides forecasts and watches for tornadoes, severe thunderstorms, lightning, wildfires, and winter weather for the United States.
- Weather Prediction Center (WPC) is responsible for preparing a variety of analysis, national guidance products, and reliable national forecasts in support of the NWS mission.

**Hydrological Services and Warnings** provides hydrological data to support forecast operations through its RFCs and provides hydrologic analysis, forecast information and decision support services to address the Nation's growing water resources challenges. This program is headquartered at the National Water Center (NWC). NWC serves as a cornerstone for Integrated Water Resources Science and Services (IWRSS) and a central hub to integrate and advance national and regional hydrologic field operations and services.

- RFCs provide daily river stage data, river forecasts and flash flood guidance for water management. A wide range of users depend on these forecasts, including those in agriculture, hydroelectric dam operation, and water supply resources. The information is also the basis for river and flash flood warnings, watches, and advisories issued by the WFOs. NWS operates 13 RFCs.
- IWRSS is a new business model for interagency collaboration consisting of a consortium of Federal agencies including of NOAA, the U.S. Army Corps of Engineers (USACE), and the U.S. Geological Survey (USGS) with complementary missions in water science, observation, management and prediction. IWRSS' overarching objective is to enable a broad, integrative national water resources information system to serve as a reliable and authoritative means for water-related planning, preparedness and response activities.

- In partnership with field offices and Federal partners, the NWC generates new and enhanced water resources to better inform and enable routine high-value and high-impact decision-making across a broad range of water and emergency management sectors.

**Tsunami Warning Program** provides reliable tsunami warnings and statements for the Nation. NWS Tsunami Program addresses national tsunami priorities, promotes community resilience, and coordinates with national and international partners to improve warnings and mitigate the loss of life and damage to property as a result of tsunamis. NWS Tsunami Program is supported by the Pacific Tsunami Warning Center (PTWC) in Hawaii and the National Tsunami Warning Center (NTWC) in Alaska. Duties are as follows:

- Develop new processes and techniques to improve response times, tsunami onset forecast accuracy, and message content to residents in the area-of-responsibility.
- Issue tsunami watches and warnings for all U.S. communities at risk and for international areas by agreement or compact.
- Increase community preparedness and public tsunami education through the TsunamiReady™ program and outreach.

**Pacific Island Compact** is part of the U.S. Compact of Free Association (COFA) with the Republic of the Marshall Islands (RMI), the Federated States of Micronesia (FSM), and the Republic of Palau (ROP) in which the U.S. government provides basic government and commerce services including weather services to these island nations. The Compact provides the necessary funding to support the NWS WSOs and associated weather warning, forecast, and observation services for these islands. This continued investment preserves critical weather observation infrastructure and services necessary to support core NOAA mission responsibilities in the Pacific such as aviation, typhoon, and marine forecasts; climate monitoring; and support to U.S. Navy operations.

#### **Schedule and Milestones:**

FY 2017 – 2021

- Operate national network of WFOs that provide 24x7 weather surveillance, forecast and warning services
- Operate national network of RFCs that provide river stage, flow and flood guidance
- Operate the NCEP service centers that monitor the tropics, warn of space weather hazards, predicts tornadoes, provides outlooks for climate events and develops foundational data sets
- Operate the NWC to support water resource decision making across the Nation
- Train and certify Incident Meteorologists (IMETs) for support of wildland fire decision making
- Provide IDSS to core governmental partners during routine and high impact events
- Embed NWS meteorologists within all FAA Air Traffic Control Centers and FAA Command Center to provide IDSS to traffic managers in support of flight safety
- Operate TWCs to monitor and predict the development and onset of tsunamis along the Nation's coasts
- Provide weather support to the Nations of the Pacific Island Compact

FY 2017

- Begin full operations capability of Whole Atmosphere Model (WAM)

FY 2018

- Begin SWPC generated regional nowcasts and short term forecasts of ionospheric disturbances

**Deliverables:**

- Operations and maintenance of all WFOs, RFCs, National Centers, and Tsunami Warning Centers
- Operations and maintenance of field operational support from National Headquarters
- Operations and maintenance of OCONUS WSOs that provide weather warnings, forecasts, and observation services to participants of the Pacific Island Compact and remote portions of Alaska
- Improved hydrological forecasts
- Improved forecasts of space weather conditions
- Improved forecasts of hurricanes, blizzards, heat waves and severe storms
- Continuity of timely and accurate weather and water forecasts and warnings
- Aviation weather forecasts for all identified airports and air routes
- Distance Learning Aviation Course modules
- Deployments of IMETs to support decision makers at wildland fires
- Continued support of StormReady and TsunamiReady™ Communities

**DISSEMINATION**

The ability to communicate warnings and forecasts to the American public is essential to protect property and save lives. To be effective, NWS requires a sophisticated suite of communications systems to meet varied customer needs in a timely, reliable and authoritative manner. Funding in the Dissemination PPA buys communication technology required by NWS for collecting, tailoring, and distribution of data and products. Within this portfolio, NWS collects and distributes data products internally and externally and transmits experimental and developmental model products to enable research to operations (R2O) for the STI and AFS PPAs. Dissemination is the circulation of information in a variety of formats to multiple users, including through satellite broadcast and terrestrial networks, internet, and radio. Current major systems include the NWS Telecommunications Gateway (NWSTG), the one NWS network, NOAA Weather Radio (NWR), the Emergency Managers Weather Information Network (EMWIN), and an extensive network connecting NWS sites to one another and to NWS partners.

In 2015, NWS maintained a NWR system availability rate of 99 percent. In 2017, NWS will complete restructuring of its dissemination capabilities using an integrated, enterprise approach to ensure a scalable, extensible, and reliable system using industry best practices. This change is required to continue timely delivery of critical environmental data and products, provide capacity for substantial increases in observing, modeling, and other data volumes, and to meet the demands of an evolving service delivery paradigm.

To ensure a Weather-Ready Nation and optimize the delivery of scalable and agile dissemination capabilities, the NWS organized this PPA around infrastructure, networks and other warning-delivery services.

In general, activities in the Dissemination portfolio will:

- Operate NWS' information technology (IT) dissemination infrastructure and services;
- Identify NWS' dissemination requirements and gaps;
- Analyze NWS' system capabilities;
- Build a scalable NWS dissemination architecture, consistent with and part of the emerging NOAA enterprise architecture; and,
- Maintain a strategy to maximize effectiveness while minimizing cost.

To achieve these goals, Dissemination maintains the following programs:

**Dissemination IT Infrastructure and Virtualized Application Services** provides a scalable, robust, secure dissemination IT infrastructure for NWS, NOAA and Federal partners.

- The NWSTG is the Nation's hub for the collection and distribution of weather data and products. The NWSTG automatically collects and distributes a wide variety of environmental data such as observations, analysis, and forecast products. These time-perishable data products are distributed to ensure the fastest availability of the information.
- Next Generation Air Transportation System (NextGen) IT services will provide enhanced, flexible access to observational weather data, hazardous-weather information, and other weather forecast products required for air traffic management. This investment supports aviation industry and stakeholders including the FAA, International Civil Aviation Organization (ICAO), and the World Meteorological Organization (WMO).

**Terrestrial and Satellite Networking Services** ensures the required networking capacity and reliability to deliver critical weather data. NWS operates and maintains critical terrestrial and satellite networking capabilities.

- NWS manages a distributed network of terrestrial telecommunication circuits, satellite communications space segments, wireless, broadband and wireless capabilities that span the Nation, including the Pacific and Alaskan regions, delivering essential NOAA data known as the one NWS network.
- The Satellite Broadcast Network (SBN) transmits critical weather data from satellites, models, observations systems and other sources, to all field office forecasters and external partners across the northwestern hemisphere. The SBN offers the capability to provide internal and external users with open access to much of NOAA's real-time environmental data.

**Weather Information Distribution Services** provides the capabilities to communicate weather related warnings directly to emergency managers and the public. NWS operates several weather warning services systems.

- NWR is the only NWS dissemination system capable of reaching individuals at nominal cost (individual purchase of NOAA weather radio) and is the only system the Federal Communications Commission mandates that broadcast media outlets monitor as a source of public safety announcements through the Emergency Alert System. Broadcast coverage reaches 98 percent of the Nation's population.
- EMWIN provides the emergency management community with access to a set of NWS warnings, watches, forecasts, and other products.
- NOAA Weather Wire Service (NWWS) is a satellite data collection and dissemination system which provides the public with timely delivery of meteorological, hydrological, climatological, and geophysical information. The vast majority of NWWS products are weather and hydrologic forecasts and warnings issued around the clock from NWS Forecast Offices.

#### **Schedule and Milestones:**

FY 2017 – 2021

- Maintain NWR and NWSTG Services
- Execute approved Roadmap for future Weather Distribution Services
- Operate and maintain NWS Network bandwidth/reliability

#### FY 2017

- Augment Dissemination Infrastructure to support requirements
- Optimize NextGen IT Services to accommodate additional data providers, users and increase data throughput
- Fully integrated NWS Geospatial Services
- Readiness of NWS dissemination systems for GOES-S and Joint Polar Satellite System-1 (JPSS-1) products

#### FY 2018

- Augment Dissemination Infrastructure to support requirements
- Optimize NextGen IT Services to accommodate additional data providers, users and increase data throughput
- Maintain/Enhance Geospatial Services Enterprise

#### FY 2019

- Conduct (first year) of five year refresh of Dissemination Infrastructure hardware
- Optimize NextGen IT Services to accommodate additional data providers, users and increase data throughput
- Maintain/Enhance Geospatial Services Enterprise

#### FY 2020

- Conduct (second year) of five year refresh of Dissemination Infrastructure hardware
- Maintain NextGen IT Services to accommodate additional data providers, users and increase data throughput
- Maintain/Enhance Geospatial Services Enterprise

#### FY 2021

- Conduct (third year) of five year refresh of Dissemination Infrastructure hardware
- Maintain NextGen IT Services to accommodate additional data providers, users and increase data throughput
- Maintain/Enhance Geospatial Services Enterprise

#### **Deliverables:**

- NWSTG functionality and continued 24x7 support at 99.8 percent availability
- NWR service availability at 96 percent
- Integration of enhanced weather data into air traffic management system
- 24x7 support of SBN
- Operational Terrestrial and Satellite Networking Services

### **SCIENCE AND TECHNOLOGY INTEGRATION**

Integrated and modernized NWS services are needed to improve environmental information which safeguards life and livelihoods. Funding in NWS' STI PPA leverages the entire weather enterprise including users, research communities, partner agencies, and industry to provide improved weather forecast guidance for the Nation. This includes engaging partners in outreach efforts, supporting targeted development efforts, improving a suite of forecast guidance models and post-processing, continuously training workforce on scientific advances, and infusing new science into operations. Within this portfolio, NWS identifies and transfers new science concepts and techniques to improved operational warning, forecast and decision support services, thus enabling the NWS vision to build a Weather-Ready Nation.



In 2015, NWS upgraded the Hurricane Weather Research and Forecasting (HWRF) model, enabling global coverage for tropical cyclone predictions. HWRF, operational since 2007, is one of two NOAA models designed to produce hurricane guidance products. Improvements have been made to the HWRF modeling system annually, resulting in a steady reduction in hurricane track and intensity forecast errors. Additionally, NWS implemented significant enhancements to its Global Forecast System (GFS) and Global Data Assimilation System (GDAS) computer numerical weather prediction (NWP) systems. The GFS/GDAS upgrade is anticipated to produce more accurate forecasts out to 10 days at high resolution and out to 16 days at lower resolution. For FY 2017, key actions included in the STI portfolio include:

- Accelerate applications of advanced observing capabilities including data assimilation;
- Develop advanced operational numerical forecast models and applications of HPC capabilities;
- Develop the next generation warning and forecast guidance paradigm, taking into account users perspectives about warning and forecast information;
- Use test beds and proving grounds to enable the research community to leverage operational infrastructure to conduct research, thus accelerating R2O transition;
- Continue development of advanced training approaches to enable the workforce to keep pace with advanced science and technologies; and,
- Rapidly develop solutions to address regional and local forecast issues through partnership with the university research community.

To achieve these goals, NWS maintains the following programs:

**Weather-Ready Nation (WRN)** is a nationwide initiative to build community resilience in the face of increasing vulnerability to extreme weather, water and climate events. A WRN is one in which emergency managers, first responders, government officials, businesses, and the public are empowered to make faster, smarter decisions to save lives and protect livelihoods. Key STI actions that enable implementation of the WRN roadmap include:

- Develop, transition, and improve advanced forecast tools, techniques, service products and next generation warning and forecast paradigms to enhance NWS' national, regional and local warning, forecast, and guidance services.
- Incorporate and integrate social science into forecasting process to develop more effective decision support capabilities, improving the effectiveness of warnings and forecasts, and better conveying forecast risk and uncertainty.
- Develop skillful, high-resolution probabilistic weather information consistent across space and time for all National Airspace System managers to support safe air traffic operations.
- Extend warning and forecast lead times for tornado, hurricane, storm surge, fire weather, and winter storms with increased certainty and confidence. Develop and improve models, tools and data sets to forecast and monitor in real-time climate variations.
- Improve space weather warning and forecast for geomagnetic and radiation storms and ionospheric disturbances to protect the reliability and resiliency of the Nation's electric power system, satellite navigation and telecommunication infrastructure, and support aviation and space flight safety.

**Operational Environmental Prediction Modeling Suite** is the foundation for all warning, forecast and decision support services. The Environmental Modeling Center (EMC) develops, enhances, and maintains complex software of numerical weather, ocean, climate, sea ice, and coastal prediction models and data assimilation systems that span the globe. These forecast systems underpin all NOAA forecast capabilities. The operational modeling suite provides the

basic numerical guidance that NWS forecasters rely on in making forecasts, warnings, and decision support service products.

- EMC integrates advancements of environmental prediction modeling research and development at universities and research laboratories, and incorporates them into advanced NWS operational models.
- EMC also collaborate with partners within NOAA and with other Federal agencies to conduct studies to validate observing requirements and data impacts for existing and new observing platforms and technologies such as satellites and radar.

**Improving Effectiveness of Warning and Forecasts** aims to accelerate the transition of advanced modeling research into operations. This program is focused on improving warning and forecast lead-times and accuracy of severe weather events associated with hurricanes, tornados, flash floods and other severe weather hazards. Major efforts include:

- Improving the accuracy and reliability of hurricane track and intensity forecasts, through the Hurricane Forecast Improvement Project (HFIP) to reduce unnecessary evacuations. This effort also focuses on advanced data assimilation and improved global atmospheric ocean models, which underpin forecast systems for all severe weather.
- The Next Generation Global Prediction System (NGGPS) will form the backbone of NOAA's future operational numerical weather prediction capability meeting the public's evolving needs for more accurate, more specific, longer lead time weather forecasts. NGGPS will result in significant advancements for warning and forecasts skill across multiple service areas.
- Develop and evaluate national air quality forecast models to provide national pollutant forecast information for states, local communities, commercial sectors, the Environmental Protection Agency, and the Department of State.

**Hydrology and Water Resource Programs** leverage NOAA partnerships for atmosphere, watersheds, estuaries and oceans to improve and integrate water resource prediction modeling capabilities. NWS' Hydrology Laboratory conducts studies, investigations and analyses leading to the application of new scientific and computer technologies for hydrologic forecasting and related water resources problems.

- NWS transitions research in atmosphere, watershed, estuary and ocean modeling and data assimilation science and technology into operational hydrologic and water resource forecast capability that provides integrated decision support tools that offers a seamless suite of summit-to-sea forecasts.
- Through partnerships, especially the IWRSS Consortium, NWS is developing a new suite of high-resolution forecasts of stream flow, soil moisture, soil temperature and other variables directly related to watershed conditions to enable monitoring and forecasting hydrologic conditions from floods to droughts.
- Under this program NWS initiated an effort in FY 2015 to develop and test new centralized national hydrologic modeling and forecast capabilities to be deployed at the NWC.

**Training Infrastructure** is critical to preparing the current and future workforce for WRN. Effective training leads to better integration of new models, transition of science and technology into operations, and improved service to the Nation. The NWS workforce must remain agile and flexible to meet core partner needs. NWS uses a blended learning approach, including online courses, webinars, and residence training.

- Implementation of these training initiatives requires new and enhanced methods and technologies for training delivery, such as simulations and on-demand training integrated into applications and other systems.

- Identify and address local training needs, facilitate professional development, and address individual strengths and weaknesses of the local forecast staff; and,
- Ensure local operations and management teams are fully proficient and knowledgeable in protocols, tools, forecast and warning operations for delivery of effective IDSS.

**Strengthen Field Operations** through a continuous infusion of science and technology. This is critical for improving services and ensuring the current and future workforce is prepared to meet the requirements of a WRN. These actions include:

- Centrally manage national and regional implementation of research to operations transition at the local level including applications that improving model guidance;
- Maintain local science and training expertise through the Science and Operations Officers (SOO) and the Development and Operations Hydrologists (DOH) to lead coordinated improvements of operations through adopting new science and technology by the forecasting staff, and addressing local forecast and warning issues;
- Sponsor collaborative research projects through the Collaborative Science, Technology, and Applied Research (CSTAR) Program to identify new science concepts and techniques for improvement of NWS services;
- Leverage testbeds and operational proving grounds to establish a centralized development and testing environment (CDTE) enabling applications in real time; and,
- Provide operational platforms for broad research and development community across NWS, academia, core partners, and the weather enterprise to conduct demonstration, simulation, verification, and validation of new science and service capabilities.

#### **Schedule and Milestones:**

FY 2017 – 2021

- Conduct testing, demonstration and validation for new science and service capability through testbeds and proving grounds
- Implement model upgrades routinely
- Improve weather model and post processing guidance
- Update product suite based on customer requirements
- Demonstrate high resolution large watershed modeling with nested hyper-resolution modeling over three regional areas

FY 2017

- Implement Multi Radar and Multi-sensor (MRMS) and Grid-Point Statistical Interpolation (GSI) based data assimilation upgrade for the High-Resolution Rapid Refresh (HRRR)
- Implement operational centralized water forecast modeling suite
- Begin implementation of results from workforce analysis

FY 2018

- Implement Next Generation Global Modeling System, Version 1.0
- Implement high resolution, ensemble storm surge model
- Extending operational weather outlooks from 16 days to 30 days
- Implement results from workforce analysis

FY 2019

- Implement operational seasonal Arctic sea ice outlook
- Implement version 3 of the operational Climate Forecast System
- Implement results from workforce analysis

FY 2020

- Complete transition of Operational Models to next-generation HPC systems

- Initiate operational probability-based forecasts of high impact weather for extended ranges (weeks 3 and 4)
  - Implement results from workforce analysis
- FY 2021
- Demonstrate high resolution large watershed modeling with nested high resolution modeling over three regional areas

**Deliverables:**

- Annual upgrades to operational NOAA Hurricane Forecast System
- Probabilistic hydrologic forecasts for assessing river level and flood risks
- Continuous improvements to NOAA's suite operational forecast models
- New and improved modeling techniques, evaluated by the Developmental Testing Center, delivered to NWS for incorporation in the Operational Modeling Suite
- Annual upgrades to operational Data Assimilation System
- Annual upgrades to NEMS infrastructure
- Upgraded ocean, atmosphere, sea ice, land surface, wave component models
- Agile HPC environment with quicker operational transition of R&D efforts
- Upgraded operational storm surge warning service products (e.g., inundation map)
- Upgraded probabilistic storm surge guidance
- Coupled ocean-atmosphere-wave-sea ice forecast system for Arctic ocean
- Operational seasonal sea ice outlook guidance products for Arctic Ocean
- Forecaster applications (tools, methodologies, datasets) of near real time data products from research ocean remote sensing satellites
- Week-2, 3 & 4 to seasonal climate outlook tools/products for local decision support services
- New NWS experimental products focused on extreme events
- Global operational coupled atmosphere-ocean-land-wave-sea ice prediction system extending today's operational weather outlooks from 16 days out to 30 days
- Improved forecasts are provided to the Nation's critical infrastructure to ensure lives and property are protected from the effects of space weather
- Comprehensive analyses of workforce
- Evaluation of NWS testing/demonstration plans and results
- Improved public access to Federal water information

**PROGRAM CHANGES FOR FY 2017:**

**Observations: National Mesonet Program: (Base Funding: \$18,000,000 and 0 FTE; Program Change: -\$11,487,000 and 0 FTE):** NOAA requests a decrease of \$11,487,000 and 0 FTE for a total \$6,513,000 and 0 FTE. NOAA is using congressionally directed funding to continue to ingest data from mesonets, which can identify small scale features at the 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. Consistent with the Consolidated Appropriations Act, 2016, lightning data procurements are now included within the National Mesonet Program. Lightning, like other mesonet data, are external observations which furthers NWS' ability to warn for severe weather. NWS created a National Mesonet Program within NOAA through the Consolidated Appropriations Act, 2014.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** National Weather Service  
**Sub-program:** Observations  
**Program Change:** National Mesonet Program

<b>Object Class</b>	<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$78,739
11.3 Other than full-time permanent	0	100
11.5 Other personnel compensation	0	3,145
11.6 Leave Surcharge Full-Time	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	81,984
12 Civilian personnel benefits	0	24,277
13 Benefits for former personnel	0	37
21 Travel and transportation of persons	0	1,229
22 Transportation of things	0	2,114
23.1 Rental payments to GSA	0	2,040
23.2 Rental Payments to others	0	2,979
23.3 Communications, utilities and misc charges	0	14,539
24 Printing and reproduction	0	27
25.1 Advisory and assistance services	0	34,886
25.2 Other services	(11,487)	19,905
25.3 Purchases of goods & services from Gov't accounts	0	2,000
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	715
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	31,004
31 Equipment	0	3,179
32 Lands and structures	0	1
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	2,076
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	4
44 Refunds	0	0
99 Total obligations	(11,487)	222,996

Due to financial system limitations, the object class detail for the Program reflects the Observations PPA.

**Central Processing: Advanced Weather Interactive Processing System Cyclical Refreshment: (Base Funding: \$93,357,000 and 232 FTE; Program Change: \$5,131,000 and 0 FTE):** NOAA requests an increase of \$5,131,000 for a total of \$98,488,000 to fully fund the cyclical refreshment of Advanced Weather Interactive Processing System (AWIPS) Information Technology (IT) hardware.

**Proposed Actions:**

This request provides the minimal funding levels for AWIPS IT cyclical replacement, including servers, workstations, monitors, and printers. Without increased funding, NWS will extend AWIPS cyclical hardware replacement from the previous replacement period of three-to-five years, out to six-to-eight years.

**Statement of Need and Economic Benefits:**

AWIPS is the information processing, display, and telecommunications system that is the cornerstone of NWS field operations. This system integrates and displays meteorological, hydrological, satellite and radar data at NWS field offices. AWIPS provides to the local field forecaster capabilities to significantly improve forecasts and warnings. 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. In the event of increased downtime, NWS will implement service backup more frequently and for longer periods of time (service backup consists of transferring functions to an adjacent WFO for execution).

AWIPS has been designated a Primary Mission Essential Function (PMEF) system. AWIPS has been identified as an essential government resource in the National Security Presidential Directive/NSPD 51 and Homeland Security Presidential Directive/HSPD 20. Funding provided in this program is critical to providing adequate security for this National Critical system.

**Resource Assessment:**

Current resource assessment is provided in the Central Processing narrative.

**Schedule and Milestones:**

FY 2017-2021

- AWIPS cyclical hardware replacement interval of three-to-five years

**Deliverables:**

- AWIPS hardware availability of 98 percent

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
AWIPS Hardware Availability							
<b>With increase</b>	N/A	N/A	97.5%	98%	98%	98%	98%
<b>Without increase</b>	99%	97.5%	96%	94%	92%	88%	84%
<b>Description:</b> Approximately 3,100 pieces of critical AWIPS hardware infrastructure are in use every day at the NWS field offices and National Centers. This metric measures availability of this hardware to support NWS operations.							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** National Weather Service  
**Sub-program:** Central Processing  
**Program Change:** Advanced Weather Interactive Processing System Cyclical Refreshment

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$25,431
11.3	Other than full-time permanent	0	2
11.5	Other personnel compensation	0	636
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	26,069
12	Civilian personnel benefits	0	7,643
13	Benefits for former personnel	0	11
21	Travel and transportation of persons	0	325
22	Transportation of things	0	92
23.1	Rental payments to GSA	0	5,795
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and misc charges	0	646
24	Printing and reproduction	0	11
25.1	Advisory and assistance services	575	6,848
25.2	Other services	1,881	42,277
25.3	Purchases of goods & services from Gov't accounts	0	891
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	425	1,192
31	Equipment	2,250	4,752
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	1,933
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	3
44	Refunds	0	0
99	Total obligations	5,131	98,488



**Central Processing: Establishment of Regional Enterprise Application Development and Integration Teams: (Base Funding: \$12,645,000 and 122 FTE; Program Change: -\$10,100,000 and -98 FTE):** NOAA requests a decrease of \$10,100,000 and 98 FTE for a total of \$2,545,000 and 24 FTE to reflect the significant efficiencies that can be achieved by transitioning to a new IT service delivery model for the NWS forecast offices.

**Proposed Actions:**

The NWS has identified efficiencies which have been realized in the delivery of IT support services to field offices through investments in open source software and implementation of IT best practices. In FY 2017, NWS proposes to initiate a phased consolidation of its 122 Information Technology Officer (ITO) full-time equivalents (FTE) (one from each WFO) into a regional approach consisting of 24 ITO FTEs allocated at the six NWS Regional Headquarters and the National Headquarters through the establishment of Regional Enterprise Application Development and Integration (READI) teams.

The current service delivery model has redundancies and through regionalization of these IT support functions, significant efficiencies can be realized in service delivery. These savings can be accomplished by leveraging a more efficient service model with upgrades and improvements to existing systems and new technologies, including the completed deployment of AWIPS II. Through investments in IT, NWS has gained the ability to fulfill the ITO responsibilities remotely, including systems analysis and software modifications and updates. These technology efficiencies enable NWS to reduce its workforce without impacting its mission to protect lives and property and enable the agency to provide a higher degree of consistency in service delivery.

The READI teams will have responsibility in these two primary areas which the ITOs currently manage:

- Enterprise compatible application development and integration; and
- IT management and systems analysis.

These READI teams will ensure the working order of all computer applications and software including regular maintenance and installation of new software. The IT teams will be available to each WFO as a source of software and information technology expertise. The READI concept plans to replicate the service currently provided by on-site ITOs with a regional approach that meets or exceeds current service levels.

**Implementation:**

Upon approval, NWS will cease recruiting and hiring personnel into the legacy ITO positions and employees encumbering 98 of the 122 ITO positions will be assigned to the NWS budget Portfolio and program for which their educational background and skill sets most closely support. This will achieve the planned FTE reduction to the Central Processing portfolio, and will provide NWS the ability to phase in changes in IT support and employee position duties as described in the *Evolving Information Technology Service Delivery at National Weather Service Field Offices Report to Congress*. Due to existing and projected NWS personnel vacancies across all of the Portfolios, there will be sufficient FTE personnel capacity and budget authority to absorb these incumbent staff during FY 2017. However, the NWS may need to make future adjustments to the annual Portfolio budget spend plans to mitigate temporary imbalances in existing staff to current vacancies during the implementation period.

An assessment of incumbents' qualifications and background will be conducted to assign employees to the Portfolio and program with the end-state of the ITO implementation in mind.

Meanwhile, these incumbent ITO employees will continue to perform their local ITO functions until the READI teams are established. Therefore, the employees' organizational assignment and position description will not change immediately but will be transitioned to established NWS position billets over a four year implementation period. Final placement of employees into established billets in the proper grade, series, and position description will depend on 1) establishment and successful implementation of the READI team; and 2) alignment of staff to requirements first using voluntary personnel reassignments and then directed reassignments where necessary. In many cases, the employees will be able to quickly fill corresponding vacancies in their assigned Portfolio once the READI team is established. Examples include IT specialists in CP or meteorologist forecaster positions under Analyze, Forecast and Support where the employee qualifications and operational skills are commensurate with a vacancy in the same series and grade. In some cases, an exact match to series and grade will not be possible at the current duty location requiring eventual reassignment requiring relocation. All existing ITO employees will have a job in the NWS and will retain their current grade and salary.

**Statement of Need and Economic Benefits:**

Establishing READI teams is a critical part of evolving the NWS. NWS is taking many steps to find innovative ways of meeting its mission as well as strategically build its workforce and structure its organization. This is a step in ensuring the NWS workforce is both prepared and right sized for an evolved NWS. In 2014, NWS took important steps such as initiating NWC staffing and reorganizing NWS HQ to align with the newly approved budget and portfolio structure. In 2016, NWS is continuing those activities by bringing the NWC up to Initial Operating Capability, initiating strategic office relocations, and beginning an enterprise staffing analysis. Additionally, during 2015 NWS finalized its *Evolving Information Technology Service Delivery at National Weather Service Field Offices Report to Congress* on IT consolidation and related cost savings. This report will be submitted to the Committees in conjunction with this budget request. In 2016, NWS will be developing a strategic staffing plan which will fully show the future of the NWS workforce. Although that staffing plan is not completed, some actions such as the HQ reorganization and establishment of the READI teams provide clear operational efficiencies even in advance of that plan. Establishing the READI teams provides sustainable IT delivery operations and allows NWS to take advantage of significant technological advancements.

**Resource Assessment:**

Current resource assessment is provided in the Central Processing narrative.

**Schedule and Milestones:**

FY 2016

- Finalize consolidation and implementation plans

FY 2017

- 98 ITO FTE redirected to other NWS budget portfolios
- Initiate limited scope implementation
- Test and evaluation of READI team concept

FY 2017-2020

- Phased transition to full implementation
- Phased transition of former ITO into other NWS positions

**Deliverables:**

- READI teams meeting or exceeding current service levels

**PROGRAM CHANGE PERSONNEL DETAIL**

**Program:** National Weather Service  
**Sub-program:** Central Processing  
**Program Change:** Establishment of Regional Enterprise Application Development and Integration Teams

<b>Title:</b>	<b>Location</b>	<b>Grade</b>	<b>Number of Positions</b>	<b>Annual Salary</b>	<b>Total Salaries</b>
Information Technology Officer	various*	GS-13	(98)	\$84,443	(\$8,275,414)
Subtotal			<u>(98)</u>		<u>(\$8,275,414)</u>
Less Lapse	0%		<u>0</u>		<u>\$0</u>
Total Full-time permanent:			(98)		(\$8,275,414)
2017 Pay Adjustment	1.6%				(\$132,407)
<b>TOTAL</b>			(98)		(\$8,407,821)
<b>Personnel Data</b>			<b>Number</b>		
Full-time Equivalent Employment					
Full-time permanent			(98)		
Other than full-time permanent			<u>0</u>		
<b>Total</b>			(98)		
Authorized Positions:					
Full-time permanent			(98)		
Other than full-time permanent			<u>0</u>		
<b>Total</b>			(98)		

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** National Weather Service  
**Sub-program:** Central Processing  
**Program Change:** Establishment of Regional Enterprise Application Development and Integration Teams

<b>Object Class</b>	<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
Personnel compensation		
Full-time permanent	(\$8,408)	\$17,023
Other than full-time permanent	0	2
Other personnel compensation	0	636
Leave Surcharge Full-Time	0	0
Special personnel services payments	0	0
Total personnel compensation	(8,408)	17,661
Civilian personnel benefits	(1,692)	5,951
Benefits for former personnel	0	11
Travel and transportation of persons	0	325
Transportation of things	0	92
Rental payments to GSA	0	5,795
Rental Payments to others	0	0
Communications, utilities and misc charges	0	646
Printing and reproduction	0	11
Advisory and assistance services	0	6,273
Other services	0	40,396
Purchases of goods & services from Gov't accounts	0	891
Operation and maintenance of facilities	0	0
Research and development contracts	0	0
Medical care	0	0
Operation and maintenance of equipment	0	0
Subsistence and support of persons	0	0
Supplies and materials	0	767
Equipment	0	2,502
Lands and structures	0	0
Investments and loans	0	0
Grants, subsidies and contributions	0	1,933
Insurance claims and indemnities	0	0
Interest and dividends	0	3
Refunds	0	0
<b>Total obligations</b>	<b>(10,100)</b>	<b>83,257</b>

Due to financial system limitations, the object class detail for the Program reflects the Central Processing PPA.

**Analyze, Forecast & Support and Science & Technology Integration: Integrated Water Prediction (IWP): Driving Decisions for a Water-Prepared Nation: (Base Funding: \$9,500,000 and 0 FTE; Program Change: +\$5,250,000 and 9 FTE):** NWS requests an increase of \$5,250,000 and 9 FTE for a total of \$14,750,000 and 9 FTE to develop and 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. 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 request across both line offices total \$12,250,000 and 11 FTE.

**Proposed Actions:**

As the Federal agency charged with water prediction and warning responsibilities, NOAA is uniquely positioned to address water challenges facing our Nation. NOAA is establishing the IWP program to deliver water intelligence 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, water-quality hazards, reduced freshwater supply, and other risks. IWP will provide information necessary for decision making both during high-impact events (e.g., hurricanes, nor'easters, storm surge) and for routine water management (e.g., ecosystem health, low flow, transportation, agriculture). These new decision support services will ultimately mitigate adverse water impacts while building resilient communities. NOAA will establish an initial IWP capability through three essential and interdependent core components:

1. **New and improved water prediction services (\$4,500,000 NWS ORF, \$9,500,000 total)** that:
  - a. Connect risk and vulnerability analyses and integrated water predictions to 'street-level' community impacts, and
  - b. Conduct initial IWP operations at the NWC.
  - c. Increased cross-government collaboration with other Federal partners through incentives for co-location at NWC.
2. **New service delivery model for coastal and inland communities (\$250,000 NWS ORF, \$1,250,000 total)** that provides services and products (e.g. Geographic information System tools integrating high-resolution water level information) to local decision-makers and engages with technical parties to ensure multiple disciplines are working together.
3. **Model integration and forecast assessment (\$500,000 NWS ORF, \$1,500,000 total)** that links the current generation of terrestrial and coastal models into a common format to establish a IWP system for local decision makers to assess flood risk following a severe storm, for instance. This component will also develop the next generation of integrated Earth system models to enhance forecast precision and will systematically assess forecast skill and diagnose watershed scale processes.

<b>INTEGRATED WATER PREDICTION</b>			
<b>FY 2017 NOAA Request</b>	<b>ORF</b>	<b>PAC</b>	<b>TOTAL</b>
NOS	\$2,500,000	\$0	\$2,500,000
NWS	\$5,250,000	\$4,500,000	\$9,750,000
<b>TOTAL</b>	<b>\$7,750,000</b>	<b>\$4,500,000</b>	<b>\$12,250,000</b>

NWS will lead the new and improved water prediction services core component of this initiative. Currently the over 20 million Americans living in major cities on the coast do not have access to hydrological forecasts. NWS will establish operations at the NWC, improve forecasts, and work with communities to provide street-level water information for every stream reach in the continental United States (CONUS), at 2.7 million locations, touching virtually every citizen's local stream. NWS will support the other components of this initiative as all three pieces are closely linked. This work will include, but is not limited to, developing appropriate data exchange mechanisms between models.

The IWP initiative reflects the multi-agency science and technology priorities for FY 2017 established by the Office of Science and Technology Policy. The specific priorities supported by this cross-line office initiative are 1) global climate change, 2) national and homeland security, and 3) ocean and arctic issues, and 4) R&D for informed policy-making and management. The IWP initiative addresses these by developing actionable data and related tools to inform policy making and management through a focus on water extremes, water security, and water quality, responding to community needs for enhanced services and products to prepare for and cope with the effects of too much, too little, or poor quality water.

<b>Structure</b>			
PPA: Analyze, Forecast, & Support		PPA: Science & Technology Integration	
Base:	\$3,500,000	Base:	\$6,000,000
Program Change:	\$4,500,000	Program Change:	\$750,000

Note: See page NWS-66 for related IWP NWS program change request.

**Statement of Need and Economic Benefits:**

Today, the United States' water prediction capability is extremely limited. Less than one tenth of one percent of the nation's inland rivers and streams have associated forecasts - which are critical to a wide range of users, including farmers, fishermen, hydroelectric dam operators, and local municipalities. These forecasts, which are the basis for river flood and flash flood warnings, watches, and advisories, are lacking even within most of the nation's heavily populated coastal regions. Only the East Coast and the Gulf of Mexico have high resolution coastal and estuarine inundation predictions. Additionally, since the coastal and estuarine model system is not connected to the entire inland model system, the nation's coastal population has no understanding of how terrestrial and coastal waters combine to impact their communities., Stakeholders across regional and socioeconomic sectors continue to demand integrated, accessible and consistent water prediction information to improve water related decisions in the wake of floods, droughts, and threats to water quality.

The National Academy of Sciences (NAS) has urged NOAA to modernize and transform its hydrologic prediction capabilities and to move water prediction into the realm of Earth system prediction. IWP will begin that process by advancing in-house capabilities and leveraging existing collaborations with Federal agencies - including those under IWRSS - such as the United States Army Corps of Engineers (USACE), the United States Geological Survey (USGS), the Federal Emergency Management Agency (FEMA), State-based research institutions, and other public and private entities.

**Resource Assessment:**

NOAA opened the NWC in Tuscaloosa, Alabama in 2015. The NWC serves as an interagency center of excellence that enables researchers from varying yet related disciplines to leverage the collaboration and efficiencies that result from co-location to accelerate development of the nation's integrated water prediction capability. Recent NOAA President's Budgets have prioritized improvements in water forecasting. Demonstration projects are planned for 2015 and 2016. Funding in FY 2015 and FY 2016 is advancing key NOAA water prediction components, while Disaster Relief Appropriations Act, 2013 funds have enabled implementation of fundamental, coupled coastal and terrestrial models for over half of the Atlantic and Gulf Coast major riverine systems, a necessary foundation for the development of Next Generation Modeling capabilities. NOAA's investments addressing centralized water forecasting improvements, High Performance Computing (HPC) and coastal intelligence data for decision support are critical to this effort.

**Schedule and Milestones:*****New and Improved Water Prediction Services:***

FY 2017 - 2021

- Secure the high-performance computing, storage and networking infrastructure necessary to support IWP developmental and operational requirements, which are growing incrementally each year

FY 2017

- NWC Operations Center staffed at 12 positions

FY 2018 – 2020

- Initial provision of national water prediction products (based on Weather Research and Forecast (WRF)-Hydro) and services (such as an, impacts catalog, and stakeholder decision-support)
- Transition impacts catalog to operations twice each year as new data sets are incorporated

FY 2021

- Transition impacts catalog to operations at NWC; continue to improve estimation of impacts associated with the catalog and incorporate additional data sets as they become available
- Begin providing integrated cross-line, sector-specific decision-support operations and services with linkages to geospatial impacts using coupled WRF-HYDRO framework

***New service delivery model:***

FY 2017

- Implement the new service delivery model (with NOS lead located at the NWC)

***Model Integration and forecast assessment:***

FY 2017 - 2021

- Test, assess, refine and optimize a basic integrated water prediction framework over demonstration regions
- Develop hurricane and extratropical surge and tide operational forecast system (ADCIRC-based) coastal modeling suite in regions where it is not yet available, including the Great Lakes
- Refine model-coupling framework infrastructure, and optimize HPC platforms

FY 2017

- Ensure consistent atmospheric forcing to terrestrial and coastal models for regional demonstrations

FY 2019 - 2021

- Develop atmosphere, coastal, and terrestrial modeling components for community WRF-Hydro Earth system modeling framework, with one-way coupling for demonstration regions

FY 2020

- Integrate land surface model into WRF-Hydro

FY 2020 - 2021

- Develop medium range forecasts with zero to three day ensemble-based guidance into the framework to produce predictions out zero to seven days

**Deliverables:**

- Street-level water information for every stream reach in the CONUS, at 2.7 million locations, touching virtually every citizen's local stream
- A predictive 15-hr-to-7-day national water forecast for the entire Nation
- A 30-day water outlook for the entire Nation (excluding storm influences)
- A daily geophysical soil moisture map for the United States, dramatically enhancing the Drought Monitor and enabling new drought information products
- A 14/7 water operations center at the NWS in Alabama, providing daily situational awareness of flood and drought emergencies
- High-resolution, sector-specific products in targeted basins (basins TBD)
- An inland river and stream forecast for at least two major metropolitan centers which do not receive one today
- Atmosphere, coastal, and terrestrial modeling components integrated into the community WRF-Hydro Earth system modeling framework



**Performance Goals and Measurement Data:**

<b>Joint Performance Measure (NWS, NOS)</b>							
<b>Performance Measure:</b> Percent (%) of coastal population which will receive integrated water forecasts (i.e. forecasts coupled with terrestrial and marine models), and socioeconomic risk assessments, that do not as of FY 2015.	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	4%	11%	21%	35%	50%
<b>Without Increase</b>	0%	0%	0%	0%	0%	0%	0%
<p><b>Description:</b> Currently, 100 million people living on the coast currently do not receive a hydrologic forecast. NOAA will implement and couple terrestrial and marine models, beginning in FY 2017, to produce integrated water level forecast data for the coastal population, and provide an assessment of socioeconomic risk associated with those forecasts. In order to meet this metric, NOAA will develop and generate products and services for water forecasts, prepare the public to receive and use the forecasts, and regionally implement the service delivery model. When NOAA achieves 100 percent, the entire U.S. coastal population will receive actionable, integrated water forecast information.</p>							

<b>Joint Performance Measure (NWS, NOS)</b>							
<b>Performance Measure:</b> Cumulative number of communities with completed community impact assessments	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	4	8	15	25	35
<b>Without Increase</b>	0	0	3	3	3	3	3
<p><b>Description:</b> NOAA will work with communities around the United States to assess their risk and vulnerability to inland and coastal flooding. A completed impact assessment means that each community will have prioritized their community's risk and vulnerability from floods, both inland and coastal, and will understand how the integrated water forecasts, enabled by the increase of forecast locations associated with the IWP initiative, can help them adapt or mitigate their risks. For this measure, communities are defined as participating jurisdictions within states, including cities, towns, counties, or other groupings of participating jurisdictions, as agreed upon by the participants.</p>							

**PROGRAM CHANGE PERSONNEL DETAIL**  
**(Dollar amounts in thousands)**

**Budget Program:** National Weather Service  
**Sub-program:** Analyze, Forecast and Support  
**Program Change:** Integrated Water Prediction

<b>Title:</b>	<b>Location</b>	<b>Grade</b>	<b>Number of Positions</b>	<b>Annual Salary</b>	<b>Total Salaries</b>
Physical Scientist	Tuscaloosa, AL	14	4	\$99,785	\$399,140
Physical Scientist	Tuscaloosa, AL	13	5	\$84,443	\$422,215
Physical Scientist	Tuscaloosa, AL	12	3	\$71,012	\$213,036
Subtotal			<u>12</u>		<u>\$1,034,391</u>
Less Lapse	25%		<u>(3)</u>		<u>(\$258,598)</u>
Total Full-time permanent:			9		\$775,793
2017 Pay Adjustment	1.6%				<u>\$12,413</u>
<b>TOTAL</b>			9		<u>\$788,206</u>
<b>Personnel Data</b>			<b>Number</b>		
Full-time Equivalent Employment					
Full-time permanent			9		
Other than full-time permanent			<u>0</u>		
<b>Total</b>			9		
Authorized Positions:					
Full-time permanent			12		
Other than full-time permanent			<u>0</u>		
<b>Total</b>			12		

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** National Weather Service  
**Sub-program:** Analyze, Forecast and Support  
**Program Change:** Integrated Water Prediction

<b>Object Class</b>	<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11 Personnel compensation		
11.1 Full-time permanent	\$788	\$265,248
11.3 Other than full-time permanent	0	395
11.5 Other personnel compensation	89	25,120
11.6 Leave Surcharge Full-Time	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	877	291,640
12 Civilian personnel benefits	258	93,814
13 Benefits for former personnel	0	253
21 Travel and transportation of persons	0	4,945
22 Transportation of things	0	4,723
23.1 Rental payments to GSA	0	5,842
23.2 Rental Payments to others	0	4,857
23.3 Communications, utilities and misc charges	0	13,990
24 Printing and reproduction	0	218
25.1 Advisory and assistance services	0	8,527
25.2 Other services	265	30,246
25.3 Purchases of goods & services from Gov't accounts	3,100	5,257
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	8,995
31 Equipment	0	7,051
32 Lands and structures	0	3,288
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	11,457
42 Insurance claims and indemnities	0	7
43 Interest and dividends	0	7
44 Refunds	0	0
99 Total obligations	4,500	495,117

Due to financial system limitations, the object class detail for the Program reflects the Analyze, Forecast and Support PPA.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** National Weather Service  
**Sub-program:** Science and Technology Integration  
**Program Change:** Integrated Water Prediction

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$47,576
11.3	Other than full-time permanent	0	197
11.5	Other personnel compensation	0	1,172
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	48,945
12	Civilian personnel benefits	0	14,570
13	Benefits for former personnel	0	76
21	Travel and transportation of persons	0	817
22	Transportation of things	0	57
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	2,660
23.3	Communications, utilities and misc charges	0	954
24	Printing and reproduction	0	22
25.1	Advisory and assistance services	600	20,301
25.2	Other services	0	17,573
25.3	Purchases of goods & services from Gov't accounts	0	2,377
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	50
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	452
31	Equipment	0	1,845
32	Lands and structures	0	2,764
33	Investments and loans	0	0
41	Grants, subsidies and contributions	150	26,106
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	16
44	Refunds	0	0
99	Total obligations	750	139,585

Due to financial system limitations, the object class detail for the Program reflects the Science and Technology Integration PPA.

**Analyze, Forecast, & Support: National Tsunami Hazard Mitigation Program Grants: (Base Funding: \$14,695,000 and 27 FTE; Program Change: -\$6,000,000 and 0 FTE):**

NOAA requests a decrease of \$6,000,000 and 0 FTE for a total of \$8,695,000,000 and 27 FTE. For FY 2016, this reduction eliminates NOAA's partner funding for education and awareness programs through the National Tsunami Hazard Mitigation Program (NTHMP).

**Proposed Actions:**

NOAA proposes to eliminate NTHMP grant funding supporting local education, awareness, and inundation and evacuation map development. NOAA is not seeking to terminate NTHMP with this action. NOAA will continue to fund critical tsunami program components in order to ensure timely and accurate tsunami warnings, watches and advisories.

NOAA is committed to maintaining its strong forecast and warning program through the operations of its two Tsunami Warning Centers (Pacific Tsunami Warning Center and National Tsunami Warning Center located in Alaska), targeted research and development and international coordination activities.

**Resource Assessment:**

The current resources for this activity are being used to maintain a U.S. Tsunami Warning System in accordance with P.L.109-427. These resources reside in the both the Observations and the Analyze, Forecast, & Support narratives. This program change only affects activities in the Analyze, Forecast, & Support PPA.

**Schedule and Milestones:**

FY 2017 – 2021:

- Operate Tsunami Warning Centers
- Operate the International Tsunami Information Center and the Caribbean Tsunami Warning Program
- Sustain TsunamiReady™ Program

**Deliverables:**

- Operational Tsunami Warning Centers
- Operational International Tsunami Information Center and Caribbean Tsunami Warning Program

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b>	<b>FY 2015</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
TsunamiReady™ Communities	<b>Actual</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>With Decrease</b>	N/A	N/A	205	205	205	205	205
<b>Without Decrease</b>	190	200	210	220	230	240	250
<b>Description:</b> This measure represents the cumulative number of communities that NOAA designates as being adequately prepared for a tsunami. As a voluntary program, the communities earn the designation through spreading awareness of tsunamis, educating community members, and improving emergency evacuation plans.							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**

**(Dollar amounts in thousands)**

**Budget Program:** National Weather Service  
**Sub-program:** Analyze, Forecast, & Support  
**Program Change:** National Tsunami Hazard Mitigation Program Grants

<b>Object Class</b>		<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$265,248
11.3	Other than full-time permanent	0	395
11.5	Other personnel compensation	0	25,120
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>0</u>	<u>290,763</u>
12	Civilian personnel benefits	0	93,556
13	Benefits for former personnel	0	253
21	Travel and transportation of persons	0	4,945
22	Transportation of things	0	4,723
23.1	Rental payments to GSA	0	5,842
23.2	Rental Payments to others	0	4,857
23.3	Communications, utilities and misc charges	0	13,990
24	Printing and reproduction	0	218
25.1	Advisory and assistance services	0	8,527
25.2	Other services	0	29,981
25.3	Purchases of goods & services from Gov't accounts	0	2,157
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	8,995
31	Equipment	0	7,051
32	Lands and structures	0	3,288
33	Investments and loans	0	0
41	Grants, subsidies and contributions	(6,000)	5,457
42	Insurance claims and indemnities	0	7
43	Interest and dividends	0	7
44	Refunds	0	0
99	Total obligations	<u>(6,000)</u>	<u>484,617</u>

Due to financial system limitations, the object class detail for the Program reflects the Analyze, Forecast and Support PPA.

**Analyze Forecast & Support: Elimination of Redundant Regional Telecommunication Circuits: (Base Funding: \$490,617,000 and 2,908 FTE; Program Change: -\$3,000,000 and 0 FTE):** NOAA requests a decrease of \$3,000,000 for a total of \$487,617,000 and 2,908 FTE as a result of decommissioning legacy NWS regional networks currently funded under AFS.

**Proposed Actions:**

The NOAA Integrated Dissemination Program (IDP) is improving NWS’ network bandwidth and reliability to ensure ground readiness for GOES-R, JPSS, environmental numerical models from enhanced supercomputing, and radar data. These network improvements include consolidation of NWS’ legacy networks into the one-NWS network, which includes telecommunication circuit upgrades to ensure the network bandwidth and reliability is available to meet mission requirements. The one-NWS network provides efficiencies and cost savings with the elimination of legacy and now redundant, NWS regional telecommunication circuits.

This reduction represents the removal of redundant circuits as NWS modernizes its dissemination network. The one-NWS network will include Voice Over IP (VOIP) capabilities for the regional networks which will eliminate the need for analog telecommunications circuits. This reduction will not impact NWS’ ability to fulfill its forecasting and warning mission.

**Resource Assessment:**

The current resources for this activity are described in the Analyze, Forecast & Support narrative.

**Schedule and Milestones:**

FY 2017 - 2018

- Elimination of legacy regional telecommunication circuits as the one-NWS network is stood up

**Deliverables:**

- Decommissioned redundant regional networks

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Percent (%) of eliminated circuits	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With decrease</b>	N/A	N/A	80%	100%	100%	100%	100%
<b>Without decrease</b>	40%	60%	80%	100%	100%	100%	100%
<b>Description:</b> Percentage of eliminated redundant regional telecommunications circuits not included in the one-NWS network.							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** National Weather Service  
**Sub-program:** Analyze, Forecast & Support  
**Program Change:** Elimination of Redundant Regional Telecommunications Circuits

<b>Object Class</b>		<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$265,248
11.3	Other than full-time permanent	0	395
11.5	Other personnel compensation	0	25,120
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<hr/> 0	290,763
12	Civilian personnel benefits	0	93,556
13	Benefits for former personnel	0	253
21	Travel and transportation of persons	0	4,945
22	Transportation of things	0	4,723
23.1	Rental payments to GSA	0	5,842
23.2	Rental Payments to others	0	4,857
23.3	Communications, utilities and misc charges	(3,000)	10,990
24	Printing and reproduction	0	218
25.1	Advisory and assistance services	0	8,527
25.2	Other services	0	29,981
25.3	Purchases of goods & services from Gov't accounts	0	2,157
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	8,995
31	Equipment	0	7,051
32	Lands and structures	0	3,288
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	11,457
42	Insurance claims and indemnities	0	7
43	Interest and dividends	0	7
44	Refunds	0	0
99	Total obligations	<hr/> (3,000)	487,617



**Analyze, Forecast and Support: Operational Base Adjustment: (Base Funding: \$490,617,000 and 2,908 FTE; Program Change: -\$186,000 and 0 FTE):** NOAA requests a decrease of \$186,000 and 0 FTE for a total of \$490,431,000 and 2,908 FTE. In FY 2016 Congress provided an unspecified \$186,000 above the President's requested level for NWS' Analyze, Forecast and Support (AFS). Reductions will be realized in scalable activities such as travel and other administrative functions. At this funding level, NWS will maintain its ability to produce timely and accurate forecasts and warnings.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** National Weather Service  
**Sub-program:** Analyze, Forecast & Support  
**Program Change:** Operational Base Adjustment

<b>Object Class</b>		<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$265,248
11.3	Other than full-time permanent	0	395
11.5	Other personnel compensation	0	25,120
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<hr/> 0	290,763
12	Civilian personnel benefits	0	93,556
13	Benefits for former personnel	0	253
21	Travel and transportation of persons	(186)	4,759
22	Transportation of things	0	4,723
23.1	Rental payments to GSA	0	5,842
23.2	Rental Payments to others	0	4,857
23.3	Communications, utilities and misc charges	0	13,990
24	Printing and reproduction	0	218
25.1	Advisory and assistance services	0	8,527
25.2	Other services	0	29,981
25.3	Purchases of goods & services from Gov't accounts	0	2,157
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	8,995
31	Equipment	0	7,051
32	Lands and structures	0	3,288
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	11,457
42	Insurance claims and indemnities	0	7
43	Interest and dividends	0	7
44	Refunds	0	0
99	Total obligations	<hr/> (186)	490,431

**Dissemination: NOAA Weather Radio Operations and Maintenance: (Base Funding: \$13,374,000 and 0 FTE; Program Change: \$2,000,000 and 0 FTE):** NOAA requests an increase of \$2,000,000 for a total of \$15,374,000 to fully fund the operations and maintenance (O&M) of the NOAA Weather Radio (NWR) network at current levels.

**Proposed Actions:**

This request increases NWR O&M funding to minimum levels to operate from all 1,029 current transmitter stations. NWR lease costs, including tower and ground, have increased significantly over the last several years as NWS competes with the growing cellular industry. Without this funding, NWS will be required to decommission approximately 235 NWR transmitter stations.

**Statement of Need and Economic Benefits:**

NWR infrastructure is a national warning network consisting of 1,029 transmitter stations with a broadcast coverage that reaches more than 98 percent of the Nation’s population providing critical weather and other hazard information to the U.S. public and media outlets. NWR is the only NWS dissemination system capable of reaching individuals at nominal cost (individual purchase of NOAA weather radio) and is the only system the Federal Communications Commission mandates that broadcast media outlets monitor as a source of public safety announcements through the Emergency Alert System. Broadcast coverage currently reaches over 98 percent of the Nation’s population.

**Resource Assessment:**

Current resource assessment is provided in the Dissemination narrative.

**Schedule and Milestones:**

FY 2016-2021

- NWR operating from 1,029 transmitters

**Deliverables:**

- Over 98 percent of the Nation’s population having access to NWR

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Number of NWR Transmitter Stations							
<b>With increase</b>	N/A	N/A	1,029	1,029	1,029	1,029	1,029
<b>Without increase</b>	1,029	913	794	794	794	794	794
<b>Description:</b> Reduced O&M funding levels require reduction to number of NWR transmitters. Reduction of transmitter stations corresponds to reduction in percentage of U.S. population having access to critical NWR alerts, warnings and information.							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** National Weather Service  
**Sub-program:** Dissemination  
**Program Change:** NOAA Weather Radio Operations & Maintenance

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$6,911
11.3	Other than full-time permanent	0	2
11.5	Other personnel compensation	0	298
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	7,211
12	Civilian personnel benefits	0	2,095
13	Benefits for former personnel	0	3
21	Travel and transportation of persons	0	276
22	Transportation of things	0	68
23.1	Rental payments to GSA	0	639
23.2	Rental Payments to others	600	4,000
23.3	Communications, utilities and misc charges	1,200	10,347
24	Printing and reproduction	0	3
25.1	Advisory and assistance services	0	1,385
25.2	Other services	0	19,265
25.3	Purchases of goods & services from Gov't accounts	0	400
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	200	784
31	Equipment	0	638
32	Lands and structures	0	77
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	45
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	2,000	47,236

Due to financial system limitations, the object class detail for the Program reflects the Dissemination PPA

**Science & Technology Integration: Shift R2O Toward An Integrated Approach: (Base Funding: \$138,835,000 and 470 FTE; Program Change: -\$3,000,000 and 0 FTE):** NOAA requests a decrease of \$3,000,000 and 0 FTE for a total of \$135,835,000 and 470 FTE to slow the development of the Hurricane Forecast Improvement Project (HFIP) and model coupling.

**Proposed Actions**

NOAA will refocus its R2O efforts from separate global, regional and application specific modeling and forecast improvements to an integrated approach. NOAA will integrate projects such as The Next Generation Global Prediction System (NGGPS) and improving Mid-Range Weather Outlooks. The integrated global and regional modeling and forecast improvements approach, specifically NGGPS, will lead to improvements of all NWS service areas. NGGPS, initiated in FY 2014, is expected to significantly improve NWS hazard weather warning and forecast accuracy and lead-times for severe weather and threats such as tornados, severe thunderstorms, snow storms, flash floods, droughts, floods, and heat waves.

To focus on integrated modeling, NWS must shift focus away from existing R2O efforts which are too specialized. Specifically, NOAA proposes to reduce its HFIP investment. Since inception, HFIP has made significant progress and have enabled NOAA meet its five year goals of 20 percent improvement for both track and intensity. NOAA will maintain currently developed hurricane models within the NWS operational environment and therefore benefit from previous HFIP work.

**Resource Assessment:**

The current resources for this activity are described in the Science and Technology Integration narrative.

**Schedule and Milestones:**

FY 2017 – 2021:

- Complete annual updates to operational HWRF at NCEP
- Complete annual updates to current generation operational global forecast system at NCEP
- Implement NGGPS version 1.0

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> 48 hour Hurricane Track Error in nautical miles (Indicator 3.2d)	<b>CY 2015 Target</b>	<b>CY 2016 Target</b>	<b>CY 2017 Target</b>	<b>CY 2018 Target</b>	<b>CY 2019 Target</b>	<b>CY 2020 Target</b>	<b>CY 2021 Target</b>
<b>With decrease</b>	N/A	N/A	68	65	62	59	57
<b>Without decrease</b>	77	71	68	65	60	56	53
<b>Description:</b> Please see measure description under the Annual Performance Plan (APP) under section Targets and Performance Summary. Values are tracked by hurricane season rather than fiscal year. Therefore FY 2015 actuals reported here are for the Calendar Year (CY) 2014 Hurricane Season which spans from June 1, 2014 and ends on November 30, 2014. CY 2015 Hurricane GPRA final values will not be available until late February 2016.							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** National Weather Service  
**Sub-program:** Science and Technology Integration  
**Program Change:** Shift R2O Toward An Integrated Approach

Object Class	FY 2017 Decrease	FY 2017 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$47,576
11.3 Other than full-time permanent	0	197
11.5 Other personnel compensation	0	1,172
11.6 Leave Surcharge Full-Time	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	48,945
12 Civilian personnel benefits	0	14,570
13 Benefits for former personnel	0	76
21 Travel and transportation of persons	0	817
22 Transportation of things	0	57
23.1 Rental payments to GSA	0	0
23.2 Rental Payments to others	0	2,660
23.3 Communications, utilities and misc charges	0	954
24 Printing and reproduction	0	22
25.1 Advisory and assistance services	0	19,701
25.2 Other services	(2,250)	15,323
25.3 Purchases of goods & services from Gov't accounts	0	2,377
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	50
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	452
31 Equipment	0	1,845
32 Lands and structures	0	2,764
33 Investments and loans	0	0
41 Grants, subsidies and contributions	(750)	25,206
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	16
44 Refunds	0	0
99 Total obligations	(3,000)	135,835

**Science & Technology Integration: COASTAL Act (Base Funding: \$4,629,000 and 0 FTE: Program Change: -\$4,629,000 and 0 FTE):** NOAA requests a decrease of \$4,629,000 and 0 FTE for a total of \$0 and 0 FTE for the development and implementation of the Consumer Option for an Alternative System to Allocate Losses (COASTAL) Act of 2012. NOAA is using congressionally directed funding as indicated in the Consolidated Appropriations Act, 2016 to advance essential components of the Named Storm Event Model (NSEM). NWS will further these efforts to extent possible based upon its prioritization and budgetary constraints. NWS will continue to make available its observational and model data related to land falling tropical cyclones in support of the COASTAL Act objectives.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** National Weather Service  
**Sub-program:** Science and Technology Integration  
**Program Change:** COASTAL Act

<b>Object Class</b>		<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$47,576
11.3	Other than full-time permanent	0	197
11.5	Other personnel compensation	0	1,172
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>0</u>	<u>48,945</u>
12	Civilian personnel benefits	0	14,570
13	Benefits for former personnel	0	76
21	Travel and transportation of persons	0	817
22	Transportation of things	0	57
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	2,660
23.3	Communications, utilities and misc charges	0	954
24	Printing and reproduction	0	22
25.1	Advisory and assistance services	0	19,701
25.2	Other services	(2,129)	15,444
25.3	Purchases of goods & services from Gov't accounts	0	2,377
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	50
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	452
31	Equipment	0	1,845
32	Lands and structures	0	2,764
33	Investments and loans	0	0
41	Grants, subsidies and contributions	(2,500)	23,456
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	16
44	Refunds	0	0
99	Total obligations	<u>(4,629)</u>	<u>134,206</u>

Due to financial system limitations, the object class detail for the Program reflects the Science and Technology Integration PPA.



**APPROPRIATION ACCOUNT: PROCUREMENT, ACQUISITION, AND CONSTRUCTION  
SUB-PROGRAM: NWS SYSTEMS ACQUISITION**

The objectives of the Systems Acquisition sub-program are to:

- Enhance NOAA's operational observational suite;
- Provide high performance computing (HPC) capacity of operations and development;
- Develop forecaster tools for improved decision support; and
- Enhance NOAA's dissemination capabilities for weather and climate services and products.

**OBSERVATIONS**

The Observations Programs, Projects, and Activities (PPA) supports the life-cycle of all NWS observing system investments by providing technical solutions to address NWS operational observational requirements. With Procurement, Acquisition, and Construction (PAC) funding, NOAA improves current observational capabilities, provides large scale recapitalization of significant observational systems, and engineers technical solutions for systems to meet evolving requirements and demands.

In FY 2015, NWS initiated a Next Generation Weather Radar (NEXRAD) Service Life Extension Program (SLEP) with initial award and testing of the replacement signal processor. In FY 2017, NWS will continue signal processor deployment and initiate pedestal refurbishments.

Specifically with the PAC appropriation, the funds in the Observations PPA are used to:

- Implement improved sensors to the current observational suite; and
- Extend the service life of the Nation's weather radar network.

To achieve these goals, NWS maintains the following program:

**Radar Observations Program** executes the NEXRAD Weather Surveillance Radar -1988 Doppler (WSR-88D) system effort.

- NEXRAD is integral to NOAA's severe weather warning capability. NEXRAD provides automated signal processing, computerized data processing, and a high-capacity communications capability. NEXRAD is a tri-agency Program with NWS, the Federal Aviation Administration (FAA), and the Department of Defense (DOD). Though the system is nearing end of life, the Federal government is 20-25 years away from full deployment of the next generation of weather radar design. Therefore, NWS is undertaking a technology refresh effort to sustain NEXRAD fleet availability until the current network is replaced.

**Schedule and Milestones:**

FY 2017

*Signal Processor*

- 119 Field Signal Processors Modified

*Pedestal*

- Issue solicitation for "full-service" contract to refurbish all WSR-88D Pedestals
- 2 pedestals rebuilt

*Transmitter*

- NRC begins full scale modulator modification
- Begin receiving new transmitter backplane Printed Wiring Boards (PWB) and Circuit Card Assemblies (CCAs)

- Award transmitter chassis refurbishment contract and begin refurbishment at field sites
- 7 transmitters modified

*Shelter*

- Release request for information (RFI) to solicit industry interest and capabilities

FY 2018

*Signal Processor*

- Complete deployment of Signal Processor Replacement modification

*Pedestal*

- 52 pedestals rebuilt

*Transmitter*

- 19 transmitters modified

*Shelter*

- Develop RFP based on responses to RFI

FY 2019

*Pedestal*

- 75 pedestals rebuilt

*Transmitter*

- 59 transmitters modified

*Shelter*

- Release RFP and award contracts
- Begin shelter refurbishment via contract
- Refurbish shelters at 9 radar sites

FY 2020

*Pedestal*

- 100 pedestals rebuilt

*Transmitter*

- 110 transmitters modified

*Shelter*

- Refurbish shelters at 49 radar sites

FY 2021

*Pedestal*

- Complete pedestal rebuilds

*Transmitter*

- Complete transmitter modifications

*Shelter*

- Refurbish shelters at 93 radar sites

**Deliverables:**

- New signal processor replacing obsolete hardware; implementation of new signal processor software replacing obsolete antenna control cards
- Totally refurbished pedestals with expected service life to at least 2030
- Totally refurbished transmitters with expected service life to at least 2030
- Refurbished radar shelters

## **CENTRAL PROCESSING**

The Central Processing PPA ensures the uninterrupted flow of information from the collection of observations to central guidance production to local applications of all essential weather and climate data products, and continuity of public watches and warnings.

In FY 2015, NWS upgraded its HPC capacity from 213 trillion floating point operations per second (TeraFLOPS) to 776 TFLOPS. In FY 2017, NWS will continue to develop new Advanced Weather Interactive Processing System forecast capabilities and begin preparations for the FY 2018 Weather and Climate Operational Supercomputing System upgrade.

Central Processing objectives are achieved through the following programs:

**Weather and Climate Operational Supercomputing System (WCROSS)** supports (a) weather and climate forecasting capabilities 24/7 (b) numerical environmental prediction model development and testing, and (c) dissemination of operational products using a wide area network. These products include national and global weather, water, climate and space weather guidance, forecasts, warnings and analyses to a broad range of users and partners including other NOAA programs, government agencies, military and the general public.

WCROSS is composed of primary and backup operational supercomputing systems, storage resources, wide area network, support services, and developmental computing systems. The primary system runs the NCEP production suite. The backup is used to thoroughly test new weather and climate forecasting applications when it is not being used to run the Production Suite during a backup system test or actual emergency. The backup supercomputer system is capable of handling 100 percent of the operational workload should the primary supercomputer system be disrupted. In accordance with NOAA Critical Infrastructure Protection plans, implementation and maintenance of a redundant WCROSS architecture ensures uninterrupted flow of weather and climate data and products, such as storm watch and warning services to the public.

**Advanced Weather Interactive Processing System (AWIPS)** is an information processing, display, and telecommunications system that is the cornerstone of NWS field operations. AWIPS provides the following services:

- Integrates and displays meteorological and hydrological data, satellite, and radar data at NWS field offices;
- Acquires and processes data from sensors and local sources;
- Provides computational and display functions at operational sites;
- Provides an interactive communications system to interconnect NWS operational sites;
- Initiates the dissemination of weather and flood warnings and forecasts in a rapid and highly reliable manner; and,
- Provides the communication interface for internal and external users of much of NOAA's real-time environmental data.

Sustained investments in the AWIPS hardware, communications, and software infrastructure, are necessary for integrating many other programs such as NEXRAD, weather satellites, other weather radars, sensors, and instruments. NWS Government Performance Results Act (GPR) goals are based on the effective use of these technology investments along with advanced decision assistance tools, forecast preparation and advanced database capabilities. Continued

AWIPS improvements produce increased performance in the GPRA goals of Tornado Warning Lead Time, Flash Flood Warning Lead Time and Winter Storm Warning Lead Time.

### **Schedule and Milestones:**

FY 2017 – FY 2021

- Provide Operations and Maintenance support for WCOSS
- Provide Operations and Maintenance support for R&D HPC System
- Provide computational resources to support HFIP

FY 2017

- Prototype/define updated AWIPS hardware infrastructure
- National Centers AWIPS (NAWIPS) integration
- Improve collaboration capabilities among NWS operational units and NOAA trusted partners

FY 2018

- Implement Phase 3 upgrade of WCOSS
- Provide access to NOAA's Integrated Dissemination Program (IDP) services with AWIPS

FY 2019

- Development of integrated training capabilities within AWIPS infrastructure
- Phased implementation of new forecast tools and capabilities into AWIPS

FY 2020

- Phased implementation of new forecast tools and capabilities into AWIPS

FY 2021

- Transition to a new WCOSS computing configuration
- Phased implementation of new forecast tools and capabilities into AWIPS

### **Deliverables:**

- Operational WCOSS with full backup capability
- Production Suite (NPS) On-Time Product Generation at 99 percent
- WCOSS capacity at 3.5 PFLOPS, in each the primary and backup systems (Phase 3 upgrade)
- New forecast tools and capabilities for Impact-Based Decision Support Services/Weather Ready Nation operations
- Access to IDP services by AWIPS
- Weather Event Simulator integration into AWIPS

## **DISSEMINATION**

To ensure a Weather-Ready Nation (WRN) and optimize the delivery of scalable and agile dissemination capabilities, the Dissemination PPA is organized around infrastructure, networks and warning services.

In FY 2015, NWS successfully transferred *weather.gov* and *File Transfer Protocols* functionalities from the NWSTG to the new IDP infrastructure. In FY 2017, NWS will fully complete the NWSTG transition to IDP while completing network upgrades necessary for impending data flow increases.

Specific to the PAC appropriation, funding within the Dissemination PPA:

- Procures NWS' IT dissemination infrastructure and services

- Closes NWS' dissemination requirements and gaps
- Enhances NWS' dissemination system capabilities
- Build a scalable NWS dissemination architecture, consistent with and part of the emerging NOAA enterprise architecture.
- Develops a strategy to maximize effectiveness while minimizing cost

To achieve these goals, NWS manages the following programs:

### **NWS Telecommunications Gateway (NWSTG)**

The NWSTG is the NWS communications hub for collecting and distributing weather data and products. NWSTG provides national and global collection and distribution of environmental data and forecast products to NWS field units and external users. However current technology has delays in the collecting and disseminating of data. Upgrading the NWSTG with up-to-date technology will ensure reliable delivery of NWS products to users and will fully capitalize on better observation data and prediction models to improve services.

Weather and environmental disturbances can disrupt virtually every major public infrastructure system including transportation systems, power grids, telecommunications, and emergency response systems that protect the public. Facing these interruptions, users could be cut off from government services. Minutes (sometimes seconds) count in saving lives and the performance of the NWS dissemination systems to supply necessary information quickly is crucial. Therefore, NWSTG has been identified as an essential government resource in *Presidential Decision Directive 67 – Enduring Constitutional Government and Continuity of Government Operations*.

### **Complete and Sustain NOAA Weather Radio (NWR)**

NWR provides the NWS with the capability to quickly disseminate severe and high impact weather warnings, watches and forecasts and non-weather emergency messages to the public. NWS is currently refurbishing four hundred (400) NWR station transmitters with 1970's-installed vacuum tube technology. Newer, solid-state transmitters have a mean time between failures of over 1,000 hours, a 67 percent improvement of over the older models.

### **Ground Readiness Project (GRP)**

The GRP enables NWS to use an expected three-fold increase in environmental satellite, radar, and model data that will accompany the GOES-R launch, radar upgrades, and planned model improvements are underway. These unprecedented advances in geostationary weather satellites, polar-orbiting satellites, satellite ground systems, and numerical weather prediction supercomputing systems. All of these advances are scheduled to come online by 2017 and will lead to great improvements in weather warnings and forecasts. This data increase far exceeds the capacity of NWS current IT infrastructure to transmit the data to forecast offices, between systems, and to customers. NWS is thus updating its information technology (IT) infrastructure with the GRP to ensure adequate processing, delivery and exploitation of new environmental satellite, model, and radar data. Without these upgrades, NWS would not be able to use the new data to improve the accuracy and timeliness of weather of weather warnings and forecasts.

NWS is taking a holistic, enterprise-based approach to managing and integrating the necessary IT infrastructure redesign and upgrades. NWS primary dissemination capabilities include both a SBN and extensive terrestrial communication circuits. The SBN is a key component of the NWS AWIPS communication network that feeds data to all NWS WFOs and RFCs nationwide and distributes information among these NWS sites, as well as provides for dissemination of

information to the public and other outside users. Furthermore NWS direct readout (DRO) antennas will be enhanced to receive broadcasts from the new GOES-R series.

Specific GRP activities, spanning multiple years, include:

- Continue build-out of NWS networks to field offices (including WFOs, RFCs, and National Centers). The build-outs will be for bandwidth enhancement, improved network availability, and improved network management to ensure the NWS field offices are connected to the NOAA Dissemination Infrastructure. The enhanced networks are necessary to support testing and then operations of NOAA's new satellites, models, and radar products.
- Conducting tests of new data and products from the GOES-R Series, the JPSS Series, and enhanced weather model outputs.
- Complete the final stages of satellite direct broadcast services (e.g., for the GOES-R and Himawari satellites), including the establishment of support mechanisms.

### **Improve Dissemination Reliability Project**

The improved dissemination reliability project mitigates risk to mission operations during severe weather events by upgrading network capabilities to reduce single points of failure and increase website capacity. Many NWS field networks and websites have little or no redundancy, resulting outages, such as when a communication line is damaged. As a result, events between 2013 and 2015 led to numerous outages, delaying NWS' ability to disseminate its forecasts and warnings to emergency managers, first responders and the public. By acquiring alternate communication paths to NWS Field Offices and increasing website capacity, NWS will make network infrastructure more resilient and robust while decreasing the risk of network outages.

Specific activities, spanning multiple years, include:

- Reducing Single Points of Failure: Acquire robust and reliable networking capabilities by upgrading networking lines, including aging copper lines with fiber optics and providing two physical network paths to each NWS Field office building.
- Providing Robust and High Capacity Websites: Increase website capacity for NWS Field Offices at the primary and back-up integrated dissemination sites to ensure the Field Office websites keep up with growing requirements and increased use during severe weather events. NWS will acquire computing and storage to augment the IT dissemination infrastructure currently being stood-up at the primary and back-up sites providing 100 percent backup capabilities.

### **Schedule and Milestones:**

FY 2017-2021:

- Procure final 80 transmitters
- Install remaining 181 transmitters
- Upgrade telecoms to digital Image and Publications System
- Replace obsolete transmitter site monitoring equipment
- Procure and install 240 antennas/coaxial cables
- Procure and install 160 generators
- Replace 133 Radio Frequency (RF) test meters
- Procure 138 RF signal analyzers
- Conduct transmitter O&M
- Begin to implement alternative communication paths to NWS Field Offices
- Integrate website operations to College Park and Boulder

**Deliverables:**

- 100 percent solid state transmitter network for all ~1010 stations
- Replacement of obsolete and end-of-life NWR site components
- 96 percent or better NWR station availability
- Robust and high capacity websites for NWS Field Offices

The NWSTG and GRP schedule, milestones, deliverables, and out-year funding estimates are provided with the program change requested for these activities.

## **PROGRAM CHANGES FOR FY 2017:**

**Observations: ASOS Service Life Extension Program: (Base Funding: \$0 and 0 FTE; Program Change: +\$7,500,000 and 0 FTE):** NOAA requests an increase of \$7,500,000 and 0 FTE to establish a Service Life Extension Program (SLEP) on the aging Automated Surface Observing System (ASOS) which serves as the Nation's primary surface weather observing network. This is a multi-year effort that is anticipated to be completed in 2024.

### **Proposed Actions:**

NOAA proposes to conduct an ASOS SLEP as a cost effective approach to maintaining the aging infrastructure. The original capital investment for this system was \$227 million, and was initiated in the mid-1980s. In addition to extending its longevity, the ASOS SLEP will: enhance the overall system capabilities by enabling high speed/high resolution data transmissions required for FAA's Next Generation Air Traffic System; provide greater safety, data consistency, and accuracy; and allow for remote and cost effective maintenance, logistics, and training. The ASOS SLEP is comprised of five components:

- Replace the Acquisition Control Unit (ACU) and Data Collection Package (DCP) and deploy the new Operating System (OS) software
- Replace the Ice Free Wind Sensor (IFWS)
- Replace the Automated Weighing Precipitation Accumulation Gauge (AWPAG)
- Replace the Dew-point Sensor (DTS1)
- Upgrade ASOS Telecommunications

ASOS is tri-agency effort supporting meteorological observational requirements of the Departments of Commerce (DOC), Defense (DOD) and Transportation (DOT). The national ASOS fleet contains 992 operational sites, 961 of which will be included in a tri-agency SLEP. Of the 961 being proposed for or undergoing service life extension, DOC operates 312; DOD operates 79; DOT operates 570. This request covers SLEP requirements for NWS owned and operated ASOS sites. The DOD and DOT are participating in this effort and costs will be shared in accordance with existing interagency agreements. The Federal Aviation Administration (FAA) has already begun their SLEP and is leading the development of the new OS software, which will be deployed on both the DOT and DOC ASOS.

Performing a SLEP is critical to ensuring availability of the observing system until at least 2040. Beginning the NWS ASOS SLEP now is necessary to ensure cross government synchronization to maximize cost and deployment efficiencies. FAA's plan requires the new ACU/DCPs, the IT backbone, be fully deployed to its sites by the end of FY 2019. Therefore, NOAA's ASOS SLEP will initially focus on replacing the ACU/DCP and deploying new OS software to replace the current obsolescent software. The ACU/DCP components in the existing ASOS will stop being supported commercially starting in 2017 and are not sufficiently secure for current IT threats.

An Office of Science and Technology Policy priority for the FY 2017 budget states Earth-observation data are instrumental to services that protect human life, property, the economy, and national security, and that advance understanding of the Earth as a system. The ASOS SLEP initiative supports this priority through the technology refresh of the ACU and DCP subsystems, required to ensure ASOS is able to support NWS weather forecast activities, FAA aviation operations, and the needs of the meteorological, hydrological, and climatological research communities.



**Statement of Need and Economic Benefits:**

ASOS serves a dual role in surface observations. The system provides critical aviation weather parameters at airports supporting the air transportation industry and provides high quality meteorological data supporting NWS's forecast and warning mission. This investment mitigates high operational and aviation safety risks by extending the useful life of ASOS. Without this investment, ASOS availability will degrade rapidly beginning in 2017, causing data outages and regional gaps. These gaps would negatively impact NOAA's ability to provide aviation and general forecasts.

**Resource Assessment:**

All current Observations PAC resources support the NEXRAD SLEP. Diverting resources from the NEXRAD SLEP would extend the project, slowing its critical infrastructure replacement activities. These delays would increase risk to system operational availability of the NEXRAD array while losing synchronization with the Departments of Defense and Transportation.

**Schedule & Milestones:**

## FY 2017

## ACU/DCP Replacement

- Begin to procure, assemble, test, and ship production units
- Begin installation of the new hardware

## IFWS and AWPAG Replacements

- Establish requirements for a replacement sensor
- Develop an RFI based on the requirements
- Release an RFP to procure test units

## Telecommunications Upgrade

- Validate requirements
- Develop a detailed implementation plan and strategy
- Award contract for technology insertion

## FY 2018

## ACU/DCP Replacement

- Continue to procure, assemble, test, and ship production units
- Continue installation of the new hardware

## IFWS and AWPAG Replacements

- Evaluate test units

## DTS1 Replacement

- Establish requirements for a replacement sensor
- Develop an RFI based on the requirements
- Release an RFP to procure test units

## Telecommunications Upgrade

- Test and verify of proposed links and networks
- Develop software and hardware

## FY 2019

## ACU/DCP Replacement

- Continue to procure, assemble, test, and ship production units
- Continue installation of the new hardware

## IFWS and AWPAG Replacements

- Down select will occur to identify acceptable test units
- Purchase and evaluate pre-production units

## DTS1 Replacement

- Evaluate test units
- Telecommunications Upgrade
- Test final design and architecture

FY 2020

ACU/DCP Replacement

- Complete procurement, assembly, test, and shipment of production units
- Complete installation of the new hardware

IFWS and AWPAG Replacements

- Test final configuration units

DTS1 Sensor Replacement

- Down select will occur to identify acceptable test units
- Purchase and evaluate pre-production units

Telecommunications Upgrade

- Award contract for architecture implementation

FY 2021

IFWS and AWPAG Replacements

- Perform System Test

DTS1 Sensor Replacement

- Test final configuration units

Telecommunications Upgrade

- Implement architecture

**Performance Goals and Measurement Data:**

<b>Performance Measure: ASOS service availability</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With increase</b>	N/A	N/A	98.3%	98.3%	98.3%	98.4%	98.4%
<b>Without increase</b>	98.4%	98.4%	98.3%	98.3%	98.0%	96.0%	94.0%
<b>Description:</b> This represents the percentage of time the ASOS fleet is meeting operational mission requirements. Scheduled maintenance time is excluded. ASOS operational availability levels below 96 percent have significant adverse impact on the National Airspace System leading to flight delays and cancellations.							

**Out Year Funding Estimates (\$ in thousands):**

<b>ASOS</b>	<b>FY 2016 &amp; Prior*</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC</b>	<b>Total</b>
<b>Change from FY 2017 Base</b>		7,500	10,000	10,000	8,800	7,000	N/A	N/A
<b>Total Request</b>	0	7,500	10,000	10,000	8,800	7,000	10,000	53,300

Out years are estimates. Future requests will be determined through annual budget process.

\*FY 2016 & Prior is back to FY 2014

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** National Weather Service  
**Sub-program:** Systems Acquisition  
**Program Change:** ASOS Service Life Extension Program

Object Class	FY 2017 Increase	FY 2017 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$0
11.3 Other than full-time permanent	0	0
11.5 Other personnel compensation	0	0
11.6 Leave Surcharge Full-Time	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	0
12 Civilian personnel benefits	0	0
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	50	160
22 Transportation of things	250	253
23.1 Rental payments to GSA	0	0
23.2 Rental Payments to others	0	0
23.3 Communications, utilities and misc charges	0	525
24 Printing and reproduction	0	0
25.1 Advisory and assistance services	500	1,950
25.2 Other services	1,500	3,234
25.3 Purchases of goods & services from Gov't accounts	0	290
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	12,420
31 Equipment	5,200	5,332
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	56
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	7,500	24,220

Due to financial system limitations, the object class detail for the Program reflects the Observations PPA.

**Observations: Next Generation Weather Radar Service Life Extension Program: (Base Funding: \$16,720,000 and 0 FTE; Program Change: +\$8,535,000 and 0 FTE):** NOAA requests a planned increase of \$8,535,000 and 0 FTE for a total of \$25,255,000 and 0 FTE to continue implementation of a SLEP to sustain the aging NEXRAD infrastructure that underpins severe weather forecast and warning services for high-impact events critical for a Weather-Ready Nation. This is a multi-year effort that began in FY 2015 and is anticipated to be completed in 2022.

**Proposed Actions:**

The NEXRAD SLEP initially focuses on replacing receivers and signal processors, which will soon be obsolete. This proposed increase in FY 2017 will continue the work first proposed in the FY 2015 President's Budget.

This SLEP will extend the useful life of the NEXRAD array by approximately 15 years. Refurbishing the existing system is a cost effective approach to preserving this \$3.1 billion capital investment.<sup>1</sup> Failure to invest in the SLEP at this time would lead to significant outages, causing regional radar gaps, and would greatly increase risk to the NWS warning mission.

Investment in this SLEP mitigates high operational risk by extending the useful life of the radars. Without this investment, NEXRAD availability will degrade rapidly beginning in 2020 resulting in long-duration radar outages and regional radar gaps; these radar gaps would negatively impact NOAA's ability to provide tornado and flash flood warnings.

An Office of Science and Technology Policy priority states Earth-observation data are instrumental to services that protect human life, property, the economy, and national security, and that advance understanding of the Earth as a system. The NEXRAD SLEP initiative supports this priority through the technology refresh of the NEXRAD, the primary tool used by NOAA's meteorologists for issuing warnings for flash floods, tornadoes, and severe thunderstorms critical for the Nation's air traffic management, homeland security, military operations, emergency management, and water resource management.

**Statement of Need and Economic Benefits:**

In 2011, severe weather caused over \$29 billion in economic losses and contributed to hundreds of deaths.<sup>2</sup> The primary tool used by NOAA's meteorologists for issuing warnings for flash floods, tornadoes and severe thunderstorms is the NEXRAD. For example, approximately 85 percent of all tornado warnings are based on radar detections. NEXRAD data have become integrated into America's decision support, serving air traffic management, homeland security, military operations, emergency managers, and water resource management. NEXRAD data is vital to many sectors of the economy including the public media, tourism, agriculture, transportation, and energy production.

An independent assessment of the benefits of the NEXRAD radars concluded that the introduction of the NEXRAD radar network allowed NWS to increase by 70 percent the number of tornadoes warned in advance and increased the warning lead time on all tornadoes by 80 percent. This has led to a 45 percent reduction in tornado related fatalities and a 40 percent reduction in tornado related injuries.

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<sup>1</sup> Derived from "The Federal Plan for Meteorological Services and Supporting Research", FY 1980-2000.

<sup>2</sup> NOAA/National Climatic data Center, <http://www.ncdc.noaa.gov/billions/events.pdf>

The new signal processor hardware introduced by SLEP will greatly increase processing speed, supporting immediate implementation of advanced radar signal processing algorithms that improve sensitivity and sampling rates of precipitation elements. This will enhance NWS' performance relative to the GPRA Tornado Warnings Lead Time metric. Specifically, whitening and oversampling (introduced in FY 2016-2018) allow faster antenna rotation while improving data quality and adding more frequent scans of the lower atmosphere to better detect quick developing and short-lived tornadoes.

**Resource Assessment:**

All current Observations PAC resources support the NEXRAD SLEP. Remaining at current resource levels would extend the project by three years, slowing critical infrastructure replacement activities. These delays would increase risk to system operational availability of the NEXRAD array while losing synchronization with the Departments of Defense and Transportation.

**Schedule and Milestones:**

FY 2017

*Signal Processor*

- 119 Field Signal Processers Modified

*Pedestal*

- Issue solicitation for "full-service" contract to refurbish all WSR-88D Pedestals
- 2 pedestals rebuilt

*Transmitter*

- NRC begins full scale modulator modification
- Begin receiving new transmitter backplane PWBs and CCAs
- Award transmitter chassis refurbishment contract and begin refurbishment at field sites
- 7 transmitters modified

*Shelter*

- Release request for information (RFI) to solicit industry interest and capabilities

FY 2018

*Signal Processor*

- Complete deployment of Signal Processor Replacement modification

*Pedestal*

- 52 pedestals rebuilt

*Transmitter*

- 19 transmitters modified

*Shelter*

- Develop RFP based on responses to RFI

FY 2019

*Pedestal*

- 75 pedestals rebuilt

*Transmitter*

- 59 transmitters modified

*Shelter*

- Release RFP and award contracts
- Begin shelter refurbishment via contract
- Refurbish shelters at 9 radar sites

FY 2020

*Pedestal*

- 100 pedestals rebuilt

*Transmitter*

- 110 transmitters modified

*Shelter*

- Refurbish shelters at 49 radar sites

FY 2021

*Pedestal*

- Complete pedestal rebuilds

*Transmitter*

- Complete transmitter modifications

*Shelter*

- Refurbish shelters at 93 radar sites

**Deliverables:**

- New signal processor replacing obsolete hardware
- Totally refurbished pedestals with expected service life to at least 2030
- Totally refurbished transmitters with expected service life to at least 2030
- Refurbished radar shelters

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> NEXRAD service availability	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	96%	96%	96%	96%	96%
<b>Without Increase</b>	98%	96%	96%	96%	96%	94%	90%
<b>Description:</b> NEXRAD data is critical to severe weather warnings. System availability levels below 96 percent poses considerable risk to maintaining severe weather warning performance levels. Engineering and logistics analyses have shown that NEXRAD service availability will fall rapidly below 96 percent beginning in 2020 without a SLEP investment, resulting in long-duration outages and regional radar coverage gaps. The goal of SLEP is to prevent this decrease and sustain service availability above 96 percent through at least 2030.							

**Out year Funding Estimates (\$ in thousands):**

<b>NEXRAD SLEP</b>	<b>FY 2016 &amp; Prior*</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC</b>	<b>Total</b>
<b>Change from FY 2017 Base</b>		8,535	6,233	(3,811)	(4,521)	(6,776)	N/A	N/A
<b>Total Request</b>	26,020	25,255	22,953	12,909	12,199	9,944	5,811	115,091

Out years are estimates. Future requests will be determined through annual budget process.

\*FY 2016 & Prior is back to FY 2014

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** National Weather Service  
**Sub-program:** Systems Acquisition  
**Program Change:** Next Generation Weather Radar Service Life Extension Program

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	0
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	110
22	Transportation of things	35	38
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and misc charges	0	525
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	1,450
25.2	Other services	450	2,184
25.3	Purchases of goods & services from Gov't accounts	0	290
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	12,420
31	Equipment	8,050	8,182
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	56
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	0	0
44	Refunds	0	0
99	Total obligations	8,535	25,255

Due to financial system limitations, the object class detail for the Program reflects the Observations PPA.

**Central Processing: Integrated Water Prediction (IWP): Driving Decisions for a Water-Prepared Nation. (Base Funding: \$44,169,000 and 22 FTE; Program Change: +\$4,500,000 and 0 FTE:** NWS requests an increase of \$4,500,000 and 0 FTE for a total of \$48,669,000 and 0 FTE develop and 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. 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 request across both line offices total \$12,250,000 and 11 FTE.

**Proposed Actions:**

As the Federal agency charged with water prediction and warning responsibilities, NOAA is uniquely positioned to address water challenges facing our Nation. NOAA is establishing the IWP program to deliver water intelligence 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, water-quality hazards, reduced freshwater supply, and other risks. IWP will provide information necessary for decision making both during high-impact events (e.g., hurricanes, nor'easters, storm surge) and for routine water management (e.g., ecosystem health, low flow, transportation, agriculture). These new decision support services will ultimately mitigate adverse water impacts while building resilient communities. NOAA will establish an initial IWP capability through three essential and interdependent core components:

1. **New and improved water prediction services (\$4,000,000 NWS PAC, \$9,500,000 total) that:**
  - a. Connect risk and vulnerability analyses and integrated water predictions to ‘street-level’ community impacts, and
  - b. Conduct initial IWP operations at the National Water Center (NWC).
  - c. Increased cross-government collaboration with other Federal partners through incentives for co-location at NWC.
2. **New service delivery model for coastal and inland communities (\$0 NWS PAC, \$1,250,000 total) providing services and products (e.g. Geographic information System tools integrating high-resolution water level information) to local decision-makers and engages with technical parties to ensure multiple disciplines are working together.**
3. **Model integration and forecast assessment (\$500,000 NWS PAC, \$1,500,000 total) that links the current generation of terrestrial and coastal models into a common format to establish a IWP system for local decision makers to assess flood risk following a severe storm, for instance. This component will also develop the next generation of integrated Earth system models to enhance forecast precision and will systematically assess forecast skill and diagnose watershed scale processes.**

<b>INTEGRATED WATER PREDICTION</b>			
<b>FY 2017 NOAA Request</b>	<b>ORF</b>	<b>PAC</b>	<b>TOTAL</b>
NOS	\$2,500,000	\$0	\$2,500,000
NWS	\$5,250,000	\$4,500,000	\$9,750,000
<b>TOTAL</b>	<b>\$7,750,000</b>	<b>\$4,500,000</b>	<b>\$12,250,000</b>



This request enables NOAA to procure operational HPC resources to 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 hydrologic products and services. Currently the over 20 million Americans living in major cities on the coast do not have access to hydrological forecasts. NWS will establish operations at the NWC, improve forecasts, and work with communities to provide street-level water information for every stream reach in the continental United States (CONUS), at 2.7 million locations, touching virtually every citizen's local stream. The NOS will produce high resolution coastal and estuarine inundation models in areas with data gaps to improve decision makers' understanding of how terrestrial and coastal waters combine to affect their communities. This will be achieved by connecting hydrodynamic models to coastal models and will result in integrated and improved inundation forecasting.

Note: See pg. NWS-31 for related ORF Integrated Water Prediction NWS program change request.

**Statement of Need and Economic Benefits:**

Today, the United States' water prediction capability is extremely limited. Less than one tenth of one percent of the nation's inland rivers and streams have associated forecasts - which are critical to a wide range of users, including farmers, fishermen, hydroelectric dam operators, and local municipalities. These forecasts, which are the basis for river flood and flash flood warnings, watches, and advisories, are lacking even within most of the nation's heavily populated coastal regions. Only the East Coast and the Gulf of Mexico have high resolution coastal and estuarine inundation predictions. Additionally, since the coastal and estuarine model system is not connected to the entire inland model system, the nation's coastal population has no understanding of how terrestrial and coastal waters combine to impact their communities., Stakeholders across regional and socioeconomic sectors continue to demand integrated, accessible and consistent water prediction information to improve water related decisions in the wake of floods, droughts, and threats to water quality.

The National Academy of Sciences (NAS) has urged NOAA to modernize and transform its hydrologic prediction capabilities and to move water prediction into the realm of Earth system prediction. IWP will begin that process by advancing in-house capabilities and leveraging existing collaborations with Federal agencies - including those under IWRSS - such as the United States Army Corps of Engineers (USACE), the United States Geological Survey (USGS), the Federal Emergency Management Agency (FEMA), State-based research institutions, and other public and private entities.

**Resource Assessment:**

NOAA's current HPC resources are inadequate to support the envisioned integrated end-to-end water prediction capability. This request builds upon the existing NOAA operational HPC infrastructure described in the Central Processing section of the Narrative.

**Schedule and Milestones:**

***New and Improved Water Prediction Services***

FY 2017 - 2021

- Secure the high-performance computing, storage and networking infrastructure necessary to support IWP development and operations, growing incrementally each year
- Refine model-coupling framework infrastructure, and optimize for HPC platforms

FY 2018 – 2019

- Initial provision of national water prediction products and services based Weather Research and Forecast (WRF)-Hydro with linkages to growing impacts catalog and early sector-specific stakeholder decision-support using Operations Center staff and the new service delivery model
- Incrementally transition impacts catalog to operations at NWC twice each year as new data sets are incorporated

FY 2020

- Provide integrated cross-line, sector-specific decision-support operations and services with linkages to geospatial impacts using coupled WRF-Hydro framework

**Deliverables:**

- Street-level water information for every stream reach in the CONUS, at 2.7 million locations
- A predictive 15-hr-to-7-day national water forecast for the entire nation
- A 30-day water outlook for the entire Nation (excluding storm influences)
- Water-level products for coastal storms, combining of inland and coastal water levels for the “integrated water” impact on coastal communities
- An inland river and stream forecast for at least two major metropolitan centers which do not receive one today

**Performance Goals and Measurement Data:**

<b>Joint Performance Measure (NWS, NOS)</b>							
<b>Performance Measure:</b> Percent of coastal population which will receive integrated water forecasts (i.e. forecasts coupled with terrestrial and marine models), and socioeconomic risk assessments, that do not as of FY 2015.	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	8%	22%	41%	69%	100%
<b>Without Increase</b>	0%	0%	0%	0%	0%	0%	0%
<b>Description:</b> Currently, 100 million people living on the coast currently do not receive a hydrologic forecast. NOAA will implement and couple terrestrial and marine models, beginning in FY 2017, to produce integrated water level forecast data for the coastal population, and provide an assessment of socioeconomic risk associated with those forecasts. In order to meet this metric, NOAA will develop and generate products and services for water forecasts, prepare the public to receive and use the forecasts, and regionally implement the service delivery model. When NOAA achieves 100 percent, the entire U.S. coastal population will receive actionable, water forecast information.							

<b>Joint Performance Measure (NWS, NOS)</b>							
<b>Performance Measure:</b> Cumulative number of communities with completed community impact assessments	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	4	8	15	25	35
<b>Without Increase</b>	0	0	3	3	3	3	3
<b>Description:</b> NOAA will work with communities around the United States to assess their risk and vulnerability to inland and coastal flooding. A completed impact assessment means that each community will have prioritized their community's risk and vulnerability from floods, both inland and coastal, and will understand how the integrated water forecasts, enabled by the increase of forecast locations associated with the IWP initiative, can help them adapt or mitigate their risks. For this measure, communities are defined as participating jurisdictions within states, including cities, towns, counties, or other groupings of participating jurisdictions, as agreed upon by the participants.							

**Out year Funding Estimates (\$ in thousands):**

<b>HPC</b>	<b>FY 2016 &amp; Prior*</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC</b>	<b>Total</b>
<b>Change from FY 2017 Base</b>		2,500	2,500	2,500	2,500	2,500	N/A	N/A
<b>Total Request</b>	\$130,677	46,669	46,669	46,669	46,669	46,669	N/A	Recurring

Out years are estimates. Future requests will be determined through annual budget process.

\*FY 2016 & Prior is back to FY 2014

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** National Weather Service  
**Sub-program:** Systems Acquisition  
**Program Change:** Integrated Water Prediction

Object Class	FY 2017 Increase	FY 2017 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$2,683
11.3 Other than full-time permanent	0	75
11.5 Other personnel compensation	0	35
11.6 Leave Surcharge Full-Time	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	2,793
12 Civilian personnel benefits	0	762
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	79
22 Transportation of things	0	1
23.1 Rental payments to GSA	0	517
23.2 Rental Payments to others	0	421
23.3 Communications, utilities and misc charges	0	2,373
24 Printing and reproduction	0	0
25.1 Advisory and assistance services	4,500	46,101
25.2 Other services	0	40
25.3 Purchases of goods & services from Gov't accounts	0	64
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	6
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	305
31 Equipment	0	13,252
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	2,047
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	4,500	68,761

Due to financial system limitations, the object class detail for the Program reflects the Central Processing PPA.

**Central Processing: Reduce Research and Development High Performance Computing: (Base Funding: \$4,000,000 and 0 FTE; Program Change: -\$2,000,000 and 0 FTE):** NOAA requests a decrease of \$2,000,000 and 0 FTE for a total of \$2,000,000 and 0 FTE to sustain the dedicated Research and Development (R&D) High Performance Computing (HPC) resources for the Hurricane Forecast Improvement Project (HFIP).

**Proposed Actions**

With this decrease, NOAA will forgo future R&D HPC capacity increases in support of HFIP consistent with recent HFIP scope reductions. NOAA will maintain the previously acquired R&D HPC assets which support HFIP. NOAA will continue over time to move fully developed hurricane models into the NWS operational environment.

Since its inception, HFIP has provided funding to incrementally increase the computing available to the project within the NOAA R&D HPC System and to support the operation and maintenance of this computing. This enterprise NOAA-wide approach enables each NOAA program requiring resources to maximize its computing by sharing in the cost of investment. NWS mitigates the impacts of this decrease to the HFIP program by leveraging NOAA's R&D HPC. Additionally, NOAA is transitioning its development focus to a broader set of integrated global and regional modeling and forecast improvements to enhance all NWS service areas.

**Schedule and Milestones:**

FY 2017-2021:

- Sustain existing R&D computing capacity

**Deliverables:**

- Sustained availability of R&D HPC capacity

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> 48 hour Hurricane Track Error in nautical miles (Indicator 3.2d)	<b>CY 2015 Target</b>	<b>CY 2016 Target</b>	<b>CY 2017 Target</b>	<b>CY 2018 Target</b>	<b>CY 2019 Target</b>	<b>CY 2020 Target</b>	<b>CY 2021 Target</b>
<b>With decrease</b>	N/A	N/A	68	65	62	59	57
<b>Without decrease</b>	77	71	68	65	61	57	54
<b>Description:</b> Please see measure description under the Annual Performance Plan (APP) under section Targets and Performance Summary. Values are tracked by hurricane season rather than fiscal year. Therefore FY 2015 actuals reported here are for the Calendar Year (CY) 2014 Hurricane Season which spans from June 1, 2014 and ends on November 30, 2014. CY 2015 Hurricane GPRA final values will not be available until late February 2016.							

**Out year Funding Estimates (\$ in thousands):**

<b>HPC</b>	<b>FY 2016 &amp; Prior*</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC</b>	<b>Total</b>
<b>Change from FY 2017 Base</b>		2,500	2,500	2,500	2,500	2,500	N/A	N/A
<b>Total Request</b>	\$130,677	46,669	46,669	46,669	46,669	46,669	N/A	Recurring

Out years are estimates. Future requests will be determined through annual budget process.

\*FY 2016 & Prior is back to FY 2014

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** National Weather Service  
**Sub-program:** Systems Acquisition  
**Program Change:** Reduce R&D High Performance Computing

<b>Object Class</b>	<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$2,683
11.3 Other than full-time permanent	0	75
11.5 Other personnel compensation	0	35
11.6 Leave Surcharge Full-Time	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	2,793
12 Civilian personnel benefits	0	762
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	79
22 Transportation of things	0	1
23.1 Rental payments to GSA	0	517
23.2 Rental Payments to others	0	421
23.3 Communications, utilities and misc charges	0	2,373
24 Printing and reproduction	0	0
25.1 Advisory and assistance services	0	41,601
25.2 Other services	0	40
25.3 Purchases of goods & services from Gov't accounts	0	64
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	6
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	305
31 Equipment	(2,000)	11,252
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	2,047
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	(2,000)	62,261

Due to financial system limitations, the object class detail for the Program reflects the Central Processing PPA.

**Dissemination: Re-architected NWS Telecommunications Gateway: (Base Funding: \$10,799,000 and 0 FTE; Program Change: -\$7,604,000 and 0 FTE):** NWS requests a planned reduction of \$7,604,000 and 0 FTE for a total of \$3,195,000 and 0 FTE to reflect the completion of a re-architected NWS Telecommunications Gateway (NWSTG) at the dissemination IT infrastructure primary and backup sites in College Park, MD and Boulder, CO.

**Proposed Action:**

A re-architected NWSTG fully eliminates a single point of failure for the collection and dissemination of timely weather, climate, and hydrologic products. The re-architected NWSTG capability will ensure modern, scalable, extensible, and reliable dissemination and infrastructure services using best practices and provide 100 percent backup capability. NOAA will be poised to accommodate higher data volumes driven by increased satellite, numerical model data and climate observations and other requirements, and to maintain system integrity and reliability.

In FY 2017 NOAA will operationalize a re-architected NWSTG. The funding reduction in FY 2017 is associated with the planned project decrease. Funding in FY 2018 and beyond will support the cyclical hardware refresh of NWSTG.

**Resource Assessment:**

Remaining Dissemination PAC resources support the re-architected NWS Telecommunications Gateway (NWSTG), GRP, the improved dissemination reliability project and NWR transmitter refurbishment projects. A re-architected NWSTG fully eliminates a single point of failure for the collection and dissemination of timely weather, climate, and hydrologic products. The GRP enables NWS to use an expected three-fold increase in environmental satellite, radar, and model data that will accompany the GOES-R launch, radar upgrades, and planned model improvements are underway. The improved dissemination reliability project mitigates risk to mission operations during severe weather events by upgrading network capabilities to reduce single points of failure and increase website capacity. NWS is currently refurbishing four hundred (400) NWR station transmitters with 1970's-installed vacuum tube technology. Newer, solid-state transmitters have a mean time between failures of over 1,000 hours, a 67 percent improvement of over the older models.

**Schedule and Milestones:**

FY 2017

- Operationalize Re-architected NWSTG capabilities at dissemination IT infrastructure primary and backup sites

FY 2018 - 2021

- Steady-State

**Deliverables:**

- Completed dissemination IT infrastructure for dissemination services at primary and backup sites
- Completed initial Re-architected NWSTG capabilities at dissemination IT infrastructure primary site
- Completed capabilities to support continuation of full porting and testing of Re-architected NWSTG capabilities onto dissemination IT infrastructure
- Full operational capabilities for Re-architected NWSTG by FY 2017 to include NWSTG 100 percent backup capabilities



**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> System Availability	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Decrease</b>	N/A	N/A	99.0%	99.9%	99.9%	99.9%	99.9%
<b>Without Decrease</b>	98.9%	98.0%	99.0%	99.9%	99.9%	99.9%	99.9%
<b>Description:</b> This metric reflects the amount of time the Dissemination system is on-line and available for distribution of NWS data to partners and the public in support of NWS' primary mission. The Dissemination system includes NWS websites.							

<b>Performance Measure:</b> Operational Backup Capability	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Decrease</b>	N/A	N/A	100%	100%	100%	100%	100%
<b>Without Decrease</b>	80%	90%	100%	100%	100%	100%	100%
<b>Description:</b> This metric reflects the percentage of NWS Dissemination systems, including websites, which have full backup capacity. The completion of the Technology Re-alignment in early FY 2014 increases the backup capabilities targets with the end goal of implementing 100 percent operational backup capability by the end of FY 2017 via the Dissemination Re-architecture project. The purpose of ensuring all functions are successfully implemented via the backup system at 100 percent level by 2017 to limit mission interruption and mission degradation to ensure NWS can meet its mission providing timely forecast, watches, and warnings to its customers.							

**Out year Funding Estimates (\$ in thousands):**

<b>NWSTG</b>	<b>FY 2016 &amp; Prior*</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC</b>	<b>Total</b>
<b>Change from FY 2017 Base</b>		(7,604)	(7,604)	(7,604)	(7,604)	(7,604)	N/A	N/A
<b>Total Request</b>	48,204	3,195	3,195	3,195	3,195	3,195	N/A	Recurring

Out years are estimates. Future requests will be determined through annual budget process.

\*FY 2016 & Prior is back to FY 2014

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** National Weather Service  
**Sub-program:** Systems Acquisition  
**Program Change:** Re-architected NWS Telecommunications Gateway

<b>Object Class</b>		<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<hr/> 0	0
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	73
22	Transportation of things	0	13
23.1	Rental payments to GSA	0	9
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and misc charges	0	3,779
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	(7,604)	19,446
25.2	Other services	0	4,767
25.3	Purchases of goods & services from Gov't accounts	0	326
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	1,780
31	Equipment	0	7,887
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
44	Refunds	0	0
99	Total obligations	0	0
44	Refunds	0	0
99	Total obligations	<hr/> (7,604)	38,080

Due to financial system limitations, the object class detail for the Program reflects the Dissemination PPA.

**Dissemination: Ground Readiness Project: (Base Funding: \$19,591,000 and 0 FTE; Program Change: -\$3,461,000 and 0 FTE):** NOAA requests a planned reduction of \$3,461,000 and 0 FTE for a total of \$16,130,000 and 0 FTE to reflect the completion of the NWS Ground Readiness Project (GRP), which will ensure utilization of the substantial increase in environmental satellite, radar, and model data to improve weather warnings and forecasts.

**Proposed Action:**

The NWS GRP investment was critical to the continued evolution of the NWS as it prepared NOAA for the three-fold increase in data volume from new environmental satellites as well as increased data from models and radar.

NOAA will complete the GRP in FY 2016 and operationalize capabilities in time for the launch of the GOES-R Satellite in FY 2017. Improvements to IT infrastructure will ensure data and information are available, accessible, and timely. The funding reduction in FY 2017 is associated with the planned project decrease. Steady state funding in FY 2018 and beyond will support GRP enhancements.

**Resource Assessment:**

Remaining Dissemination PAC resources support the re-architected NWS Telecommunications Gateway (NWSTG), GRP, the improved dissemination reliability project and NWR transmitter refurbishment projects. A re-architected NWSTG fully eliminates a single point of failure for the collection and dissemination of timely weather, climate, and hydrologic products. The GRP enables NWS to use an expected three-fold increase in environmental satellite, radar, and model data that will accompany the GOES-R launch, radar upgrades, and planned model improvements are underway. The improved dissemination reliability project mitigates risk to mission operations during severe weather events by upgrading network capabilities to reduce single points of failure and increase website capacity. NWS is currently refurbishing four hundred (400) NWR station transmitters with 1970's-installed vacuum tube technology. Newer, solid-state transmitters have a mean time between failures of over 1,000 hours, a 67 percent improvement of over the older models.

**Schedule and Milestones:**

FY 2017

- Conduct needed refresh and operations and maintenance activities as new satellite, model and radar data sets become available. Includes conducting JPSS readiness testing activities
- Conduct overall network and communication infrastructure upgrade, maintenance and improvement activities
- Continue GOES-S and JPSS pre- and post-launch testing

FY 2018 – 2021

- Conduct needed refresh and operation and maintenance activities as new satellite, model and radar data sets become available
- Conduct overall network and communications infrastructure maintenance and improvement activities

**Deliverables:**

- Improved NWS networking and communications infrastructure reliability and increased terrestrial and satellite telecommunications bandwidth
- GOES-R Rebroadcast (GRB) antennas and product generation capabilities

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Mission required satellite data processed and distributed within targeted time							
<b>With Decrease</b>	N/A	N/A	98.5%	98.5%	98.5%	98.5%	98.5%
<b>Without Decrease</b>	98.5%	98.5%	98.5%	98.5%	98.5%	98.5%	98.5%
<b>Description:</b> This metric reflects the percentage of satellite data being processed and distributed within the time frame necessary for the mission. NWS requires data from environmental satellites to successfully complete its mission. Depending on the specific use of the data, targeted time frames required may differ. Environmental satellite data is ingested into global and regional numerical weather prediction models to support the local forecast and warning processes.							

**Out year Funding Estimates (\$ in thousands):**

<b>GRP</b>	<b>FY 2016 &amp; Prior</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC</b>	<b>Total</b>
<b>Change from FY 2017 Base</b>		(3,461)	(3,461)	(3,461)	(3,461)	(3,461)	N/A	N/A
<b>Total Request</b>	50,163	16,130	16,130	16,130	16,130	16,130	N/A	Recurring

Out years are estimates. Future requests will be determined through annual budget process.

\*FY 2016 & Prior is back to FY 2014

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** National Weather Service  
**Sub-program:** Systems Acquisition  
**Program Change:** Ground Readiness Project

Object Class	FY 2017 Decrease	FY 2017 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$0
11.3 Other than full-time permanent	0	0
11.5 Other personnel compensation	0	0
11.6 Leave Surcharge Full-Time	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	0
12 Civilian personnel benefits	0	0
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	73
22 Transportation of things	0	13
23.1 Rental payments to GSA	0	9
23.2 Rental Payments to others	0	0
23.3 Communications, utilities and misc charges	0	3,779
24 Printing and reproduction	0	0
25.1 Advisory and assistance services	(3,461)	23,589
25.2 Other services	0	4,767
25.3 Purchases of goods & services from Gov't accounts	0	326
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	1,780
31 Equipment	0	7,887
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	0
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	(3,461)	42,223

Due to financial system limitations, the object class detail for the Program reflects the Dissemination PPA.

**APPROPRIATION ACCOUNT: PROCUREMENT, ACQUISITION, AND CONSTRUCTION**  
**SUB-PROGRAM: NWS CONSTRUCTION**

The objective of the Construction sub-program is to:

- Construct and provide for major repairs to Forecast Offices and other government owned weather facilities

**FACILITIES CONSTRUCTION & MAJOR REPAIRS**

To support its mission, the NWS operates and maintains facilities which are home to 122 Weather Forecast Offices (WFO), 13 River Forecast Centers (RFC), 18 Weather Service Offices (WSO) and associated employee housing units, 9 National Centers; and 2 Tsunami Warning Centers. Of the WFOs and WFO/RFCs, 36 are leased. To support these facilities, the Facilities Construction & Major Repairs PPA account is managed by NWS Headquarters in a matrixed approach.

The objectives of the Facilities Construction & Major Repairs sub-program are to:

- Upgrade and improve NOAA's Forecast Offices;
- Maintain structural integrity through capital improvements; and
- Maintain compliance with Federal law and national and local building codes.

NWS facilities are reaching and exceeding twenty five years in age and need typical capital improvements to maintain their structural and operational integrity, (e.g., heating, ventilating, and air conditioning systems (HVAC), roof and uninterruptible power supply replacements). This effort is essential to not only maintaining compliance with Federal law and national and local building codes, but also ensuring uninterrupted forecasts for local communities. In addition, recent NWS investments in facilities have addressed required tenant improvements and moving costs associated with expiring forecast office leases. A select number of expiring forecast office leases have resulted in forced relocations.

In FY 2015, NWS conducted a ribbon cutting ceremony at the NWC in Tuscaloosa, AL and began transitioning the National Logistics Support Center and National Reconditioning Center to its new facility in Kansas City, MO. In FY 2017, NWS will finalize its forced relocations from select leased forecast offices while shifting focus to major system replacement at government owned facilities to address deferred maintenance.

**Schedule and Milestones:**

FY 2017 – 2021

- Relocate select WFOs and WFO/RFCs
- Award contracts for up to three highest priority facility locations for the replacement of multiple major systems

**Deliverables:**

- Select WFOs and WFO/RFCs operating in newly leased facilities
- Up to twelve (12) highest priority major system replacements annually to ensure continued operational stability and service delivery capability annually

**Out year Funding Estimates (\$ in thousands):**

<b>Facilities Construction and Major Repairs</b>	<b>FY 2016 &amp; Prior</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC</b>	<b>Total</b>
<b>Change from FY 2017 Base</b>		0	0	0	0	0	N/A	N/A
<b>Total Request</b>	28,638	8,650	8,650	8,650	8,650	8,650	N/A	Recurring

Out years are estimates. Future requests will be determined through annual budget process.

\*FY 2016 & Prior is back to FY 2014

**PROGRAM CHANGES FOR FY 2017:**

No program change is requested for this sub-program.



## **BUDGET PROGRAM: NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE**

For FY 2017, NOAA requests a total of \$2,303,687,000 and 889 FTE for the National Environmental Satellite, Data and Information Service (NESDIS) including a net decrease of \$49,161,000 and an increase of 2 FTE program changes.

### **NESDIS OVERVIEW**

NESDIS (<http://www.nesdis.noaa.gov/>) is responsible for the procurement, launch, and operation of the Nation's civil operational environmental satellites. Along with managing and operating satellites in real time, NESDIS develops and distributes products and information based on satellite data. NOAA satellite based observations support a broad range of environmental monitoring for weather, climate, oceans, coasts and ecosystems impacting the general public and their decision-making. Satellite based observations assist with disaster mitigation through monitoring severe weather, precipitation, fires and smoke, volcano eruptions, dust storms and other air quality issues. NOAA satellite data underpin weather and other environmental forecasts, saving lives and property. NESDIS also works toward developing the next generation of satellites in order to continue meeting its primary mission essential functions without incurring gaps in data coverage.

The NESDIS Operations, Research, and Facilities (ORF) account is organized into two sub-programs: (1) Environmental Satellite Observing Systems, with \$169,300,000 and 335 FTE; and (2) National Centers for Environmental Intelligence (NCEI), with \$62,217,000 and 242 FTE.

The Environmental Satellite Observing Systems sub-program: (1) provides secure and efficient command and control of NOAA and other non-NOAA operational environmental satellites; and (2) ensures secure, timely, and uninterrupted delivery of data to users, including product processing, development, and distribution. Below are the Programs, Projects, and Activities (PPA) included in the Environmental Satellite Observing Systems sub-program:

- Satellite and Product Operations
- NOAA Satellite Operations Facility (NSOF) Operations
- Product Development, Readiness, and Application (PDR&A)
- Commercial Remote Sensing Regulatory Affairs (CRSRA)
- Office of Space Commerce (OSC) [formerly Office of Space Commercialization]
- Group on Earth Observations (GEO)

The NCEI sub-program is the official source for historical and near-real time atmospheric, space weather, climate, coastal, oceanographic, and geophysical environmental data and information.

The NESDIS Procurement, Acquisition, and Construction (PAC) account is organized into two sub-programs: (1) Systems Acquisition with \$2,119,103,000 and 310 FTE; and (2) Construction with \$2,228,000 and 0 FTE.

The Systems Acquisition sub-program acquires satellites and related instruments for all NOAA satellite programs to maintain long-term satellite data continuity.

The Systems Acquisition sub-program includes the PPAs below:

- Geostationary Systems – R Series (GOES-R)
- Jason-3
- Joint Polar Satellite System (JPSS)
- Polar Follow On (PFO)
- Cooperative Data and Rescue Services (CDARS) [Formerly Solar Irradiance Data and Rescue (SIDAR)]
- Deep Space Climate Observatory (DSCOVR)
- Space Weather Follow On
- Constellation Observing System for Meteorology, Ionosphere, and Climate (COSMIC-2)/Global Navigation Satellite System Radio Occultation (GNSS RO)
- Satellite Ground Services (SGS)
- Systems Architecture and Advanced Planning (SAAP)
- Projects, Planning and Analysis (PPA)
- Commercial Weather Data Pilot (CWDP)

The Construction sub-program includes the Satellite Command and Data Acquisition (CDA) Facility PPA and supports the operation and critical infrastructure at satellite command and data acquisition facilities.

**Significant Inflationary Adjustments:**

NOAA's FY 2017 Base includes a total of \$2,973,000 and 0 FTE to account for the full funding requirement for inflationary adjustments to current programs for NESDIS activities. This includes the estimated 2017 Federal pay raise of 1.6 percent as well as inflationary increases for non-labor activities, including service contracts, utilities, field office lease payments, and rent charges from the General Services Administration (GSA).

NOAA proposes to change the name of the Office of Space Commercialization PPA to the Office of Space Commerce to be consistent with the name change in the 2015 U.S. Commercial Space Launch Competitiveness Act (Public Law 114-90).

NOAA requests to change the name of the National Environmental Information Office (NEIO) PPA and sub-program to the National Centers for Environmental Information (NCEI) to align with the consolidation of NOAA's three existing National Data Centers as approved by Consolidated and Further Continuing Appropriations Act, 2015 (Public Law 113-235). NOAA has been operating the consolidated data centers as NCEI, continuing the tradition of unmatched expertise and trusted, authoritative data that the previous Data Centers established. This PPA name change most accurately mirrors the merged organization and cements the NCEI brand as the Nation's leading authority for environmental information. NOAA also proposes to change the name of the Solar Irradiance, Data and Rescue PPA to Cooperative Data and Rescue Services. The Total and Spectral Solar Irradiance Sensor (TSIS-1) was transitioned to NASA in FY 2016 and this name change more accurately reflects the scope of the current program at NOAA.

In addition, NOAA requests the following transfer for a net change of \$0 and 0 FTE to the agency:

<b>From Office</b>	<b>PPA</b>	<b>To Office</b>	<b>PPA</b>	<b>Amount/FTE</b>
MS	Mission Services and Management (ORF)	NESDIS	National Centers for Environmental Information (ORF)	\$519,000/ 0 FTE

NOAA requests to transfer \$519,000 and 0 FTE to move funding for operations at the David Skaggs Research Center in Boulder, CO, from Mission Support Facilities to NESDIS. This funding is currently appropriated to the Mission Services and Management PPA and then distributed to the Line and Staff Offices annually. This reallocation will increase efficiencies by eliminating the need for funding transfers subsequent to appropriation and will improve transparency.

FY 2017 Operational Phase Transfer

The NOAA satellite budget profiles in the PAC account are formulated to reflect the full life cycle cost of our satellite programs including design, development and operations. The Operational Phase Transfer is required to transfer the funding for operational functions currently budgeted within the PAC life cycle costs to the appropriate PPAs in the ORF account.

Once a satellite is launched and becomes operational, the program transitions from the development phase to the operational phase of the life cycle. At that time, the operational phase budget within the PAC account is required in the ORF account to fund the following operational functions: satellite operations, ground maintenance, product processing and distribution, algorithm maintenance, data stewardship, data center operations, and facility operations and maintenance.

In FY 2017, NOAA requests a technical adjustment to transfer the operational phase funding from the PAC account to the appropriate PPAs in the ORF account to support operational functions for the GOES-R, Jason-3, DSCOVR, and SGS programs. The Operational Phase Transfer is detailed by program below.

**GOES-R:**

NOAA requests a technical adjustment to move \$33,900,000 and 0 FTE from the GOES-R PPA in PAC to the following PPAs within ORF: Satellite and Product Operations (\$21,690,000); NSOF Operations (\$4,800,000); Product Development, Readiness and Application (\$6,000,000); and the National Centers for Environmental Information (\$1,410,000). FY 2017 is anticipated to be the first full year of GOES-R operations. This adjustment will transfer the operational phase funding currently budgeted in the GOES-R life cycle cost from PAC to the ORF account. In addition to the one time technical adjustment in FY 2017, the GOES-R profile will be reduced by the operational transfer amount in each outyear through FY 2036 to fund operational requirements through the projected GOES-R mission life.

From Office	PPA	To Office	PPA	Amount /FTE
NESDIS	GOES-R (PAC)	NESDIS	Satellite and Product Operations (ORF)	\$21,690,000/ 0 FTE
NESDIS	GOES-R (PAC)	NESDIS	NSOF Operations (ORF)	\$4,800,000/ 0 FTE
NESDIS	GOES-R (PAC)	NESDIS	Product Development, Readiness and Application (ORF)	\$6,000,000/ 0 FTE
NESDIS	GOES-R (PAC)	NESDIS	National Centers for Environmental Information (ORF)	\$1,410,000/ 0 FTE

GOES-R Life Cycle Cost\* (\$ in thousands):

GOES-R	FY 2016 & Prior*	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	CTC	Total
GOES-R (PAC)	6,952,951	752,784	518,532	335,879	214,674	148,588	1,226,651	10,150,059
SPO (ORF)	N/A	21,690	21,690	21,690	21,690	21,690	325,350	433,800
NSOF (ORF)	N/A	4,800	4,800	4,800	4,800	4,800	72,000	96,000
PDR&A (ORF)	N/A	6,000	6,000	6,000	6,000	6,000	90,000	120,000
NCEI (ORF)	N/A	1,410	1,410	1,410	1,410	1,410	21,150	28,200
<b>Total GOES-R Request</b>	6,952,951	786,684	552,432	369,779	248,574	182,488	1,735,151	10,828,059

\*The table reflects the requested funding levels in the ORF and PAC accounts for the total GOES-R life cycle cost in the FY 2017 President's Budget. For additional details on specific program changes, please see the ORF and PAC sections of the budget.

Jason-3:

NOAA requests a technical adjustment to move \$2,931,000 and 0 FTE from the Jason-3 PPA in PAC to the following PPAs within ORF: Satellite and Product Operations (\$1,777,000); Product Development, Readiness and Application (\$1,104,000); and the National Centers for Environmental Information (\$50,000). FY 2017 is anticipated to be the first full year of Jason-3 operations. This adjustment will transfer the operational phase funding currently budgeted in the Jason-3 life cycle cost from PAC to the ORF account. In addition to the one time technical adjustment in FY 2017, the Jason-3 profile will be reduced by the operational transfer amount in each outyear through FY 2022 to fund operational requirements through the projected Jason-3 mission life.

From Office	PPA	To Office	PPA	Amount /FTE
NESDIS	Jason-3 (PAC)	NESDIS	Satellite and Product Operations (ORF)	\$1,777,000/ 0 FTE
NESDIS	Jason-3 (PAC)	NESDIS	Product Development, Readiness and Application (ORF)	\$1,104,000/ 0 FTE
NESDIS	Jason-3 (PAC)	NESDIS	National Centers for Environmental Information (ORF)	\$50,000/ 0 FTE

Jason-3 Life Cycle Cost\* (\$ in thousands):

Jason-3	FY 2016 & Prior	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	CTC	Total
Jason-3 (PAC)	155,464	4,357	7,651	5,338	4,648	4,648	4,648	186,754
SPO (ORF)	N/A	1,777	1,777	1,777	1,777	1,777	1,777	10,662
PDR&A (ORF)	N/A	1,104	1,104	1,104	1,104	1,104	1,104	6,624
NCEI (ORF)	N/A	50	50	50	50	50	50	300
<b>Total Jason-3 Request</b>	155,464	7,288	10,582	8,269	7,579	7,579	7,579	204,340

\*The table reflects the requested funding levels in the ORF and PAC accounts for the total Jason-3 life cycle cost in the FY 2017 President's Budget. For additional details on specific program changes, please see the ORF and PAC sections of the budget.

DSCOVER:

NOAA requests to technical adjustment to move \$908,000 and 0 FTE from the DSCOVER PPA in PAC to the following PPAs within ORF: Satellite and Product Operations (\$556,000) and the National Centers for Environmental Information (\$352,000). The DSCOVER satellite was launched on February 11, 2015. This adjustment will transfer the operational phase funding currently budgeted in the DSCOVER life cycle cost from the PAC to the ORF account. In addition to the one time technical adjustment in FY 2017, the DSCOVER profile will be reduced by the operational transfer amount in each outyear through FY 2022 to fund operational requirements through the projected DSCOVER mission life.

From Office	PPA	To Office	PPA	Amount /FTE
NESDIS	DSCOVN (PAC)	NESDIS	Satellite and Product Operations (ORF)	\$556,000/ 0 FTE
NESDIS	DSCOVN (PAC)	NESDIS	National Centers for Environmental Information (ORF)	\$352,000/ 0 FTE

DSCOVN Life Cycle Cost\*:

DSCOVN	FY 2016 & Prior	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	CTC	Total
DSCOVN (PAC)	100,294	3,745	3,860	3,838	3,838	3,838	3,838	123,251
SGS (PAC)	N/A	1,700	700	0	0	0	0	2,400
SPO (ORF)	N/A	1,403	1,403	1,403	1,403	1,403	1,403	8,418
NCEI (ORF)	N/A	352	352	352	352	352	352	2,112
<b>Total DSCOVN Request</b>	100,294	7,200	6,315	5,593	5,593	5,593	5,593	136,181

\* The table reflects the requested funding levels in the ORF and PAC accounts for the DSCOVN life cycle cost in the FY 2017 President's Budget. For additional details on specific program changes, please see the ORF and PAC sections of the budget.

NESDIS requests a technical adjustment to move \$1,200,000 and 0 FTE from the SGS PPA in PAC to the Satellite and Product Operations (\$1,200,000) PPA in ORF. This adjustment transfers the funding to operate and maintain the backup facility at Wallops, VA, in the event of a failure to the NSOF Environmental Satellite Processing Center. This back-up facility will be complete and operational in FY 2017. This one time technical adjustment in FY 2017 along with the operational phase requirements in each outyear will be reduced from the SGS profile.

From Office	PPA	To Office	PPA	Amount (\$000)/FTE
NESDIS	Satellite Ground Services (PAC)	NESDIS	Satellite and Product Operations (ORF)	\$1,200/ 0 FTE

**APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES**  
**SUB-PROGRAM: ENVIRONMENTAL SATELLITE OBSERVING SYSTEMS**

NOAA manages environmental satellites and related ground systems to provide timely and accurate environmental data for forecasts and warnings to ensure the safety of U.S. citizens, public property, and infrastructure. Billions of dollars in damage are incurred each year due to natural disasters and extreme weather events such as tornadoes, hurricanes, floods, and drought. Data from NOAA environmental satellites substantially reduces the losses incurred by these destructive events. Thus, the continuity of these satellite systems is imperative.

The goals of NOAA's Environmental Satellite Observing Systems sub-program are to:

- Maintain and operate a system of polar-orbiting satellites which provide global imaging and sounding for medium and long-range weather forecasting and climate analysis crucial to numerical weather prediction models.
- Maintain and operate a system of geostationary satellites to provide near-continuous environmental observations of the Earth's Western Hemisphere critical for weather forecasting and severe storm tracking.
- Supply data and operational products to the public and decision-makers.
- Operate and maintain the mission control center for the Search and Rescue satellite system.
- Provide operational weather and environmental satellite observations for Alaska and the Polar Regions which include monitoring global sea ice conditions to support safe and effective marine transportation.

Each of the PPAs included within this sub-program is detailed below:

**OFFICE OF SATELLITE AND PRODUCT OPERATIONS (OSPO)** (<http://www.ospo.noaa.gov/>)

OSPO manages and directs NOAA's command and control of the suite of on-orbit satellites that supply the environmental data critical for developing weather and climate products used daily by industry and citizens across the Nation. To this end, OSPO works with NOAA's National Weather Service (NWS) to supply the satellite data that makes up approximately 93 percent of the information used in numerical weather prediction models.

In FY 2015, OSPO operated a total of 17 on-orbit satellites including: Geostationary Operational Environmental Satellites (GOES); the Polar-orbiting Operational Environmental Satellites (POES) and Suomi National Polar-orbiting Partnership (Suomi NPP); DOD's Defense Meteorological Satellite Program (DMSP); one Deep Space Climate Observatory (DSCOVR) and other non-NOAA operational environmental satellites.

OSPO's role in satellite operations is to monitor satellite health and safety; satellite operations and data acquisition to meet user needs; provide support during launch, activation, and evaluation of new satellites; assess satellite and ground station anomalies; and support appropriate recovery actions for those anomalies.

#### OSPO supports:

- NOAA Satellite Operations Facility (NSOF), the home for NOAA's 24 hours a day, 365 days a year environmental satellite operations. Through NSOF, NOAA operates the ground systems that command, control, and acquire data from NOAA's on-orbit satellites. Each day, NSOF processes more than 16 billion bytes of environmental satellite data from on-orbit NOAA and DOD satellites.
- NOAA's Search and Rescue Satellite Aided Tracking (SARSAT) system and coordinates participation in the International COSPAS-SARSAT Program.
- The Comprehensive Large Array data Stewardship System (CLASS) Operations Systems (Data Center Operations) supporting the long-term preservation of and access to the ever-increasing input of data from our observing systems (e.g., satellites, radar, and other ground observations).
- The Satellite Operations Control Center (SOCC)/Command and Data Acquisition (CDA) Facilities serving as the vital link between satellites and users by providing uninterrupted availability of critical observations and real-time delivery of satellite data to product processing centers.
- The Wallop Command and Data Acquisition (WCDAS) and the Fairbanks Command and Data Acquisition (FCDAS) providing infrastructure and computing resources necessary to operate the Local Area Network (LAN). This separate LAN is necessary to ensure low level day-to-day functions do not impact the high availability systems delivering mission critical satellite data.
- NOAA's contribution to the U.S. National Ice Center (NIC) monitoring global sea ice conditions in the Polar Regions, Great Lakes, Arctic and North Atlantic waters to support safe and effective transportation for the civil and military maritime communities. The NIC is a multi-agency operational center operated by NOAA, the United States Navy, and United States Coast Guard.

#### **Schedule and Milestones:**

##### FY 2017-FY 2021:

- Maintain Satellite Operation Facilities at Suitland, MD; Wallops, Virginia; and Fairbanks, Alaska
- Conduct annual penetration testing on all IT systems
- Continuous monitoring of all IT Systems
- Assessment and authorization for required IT Systems
- Process and distribute environmental data from Suomi National Polar-orbiting Partnership (Suomi NPP) and JPSS data, legacy GOES, POES, GOES-R, METOP

##### FY 2017

- Command and control 9 NOAA Satellites and support 11 non-NOAA Satellites
- Process and distribute Suomi NPP and JPSS products
- Bring GOES-16 (GOES-R) into operation

##### FY 2018

- Command and Control 9 NOAA Satellites and support 10 non-NOAA Satellites
- Process and distribute new JPSS products to users
- Distribute validated GOES-R products, SNPP/JPSS data, legacy GOES/POES, METOP

##### FY 2019

- Command and control 10 NOAA Satellites and support 10 non-NOAA Satellites
- Process and distribute new JPSS products to users
- Distribute validated GOES-R products, SNPP/JPSS data, legacy GOES/ POES, MetOp



FY 2020

- Command and control 10 NOAA Satellites and support 10 non-NOAA Satellites
- Process and distribute new JPSS products to users
- Distribute validated GOES-R products, SNPP/JPSS data, legacy GOES/POES, MetOp

FY 2021

- Command and Control 10 NOAA Satellites and support 10 non-NOAA Satellites
- Process and distribute new JPSS products to users
- Distribute validated GOES-R products, SNPP/JPSS data, legacy GOES/POES, MetOp

**Deliverables:**

Infrastructure Maintained # of National/Mission High and Moderate Critical Systems	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
	11	12	12	12	12

FY 2017

- Delivery of Suomi NPP data to users
- New products transitioned into operations
- Facilitate upgrade to system architecture to meet security needs and to facilitate transition of research products into operations

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Percentage of NOAA-managed satellite data processed and distributed within targeted time	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	99.6%	98.5%	98.5%	98.5%	98.5%	98.5%	98.5%

**Description:** This measure includes data from NOAA’s GOES and POES satellites. It tracks the processing and distribution of environmental data to the users. This measure is used to track timeliness and customer satisfaction. The targeted time varies per satellite: GOES is 15 minutes, POES is 180 minutes (which is based on Advanced Television Infra-Red Observation Satellite Operational Vertical Sounder timeliness).

<b>Performance Measure:</b> Percent of Suomi NPP satellite data ingested, processed, and distributed within targeted time	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	99.8%	95%	95%	95%	95%	95%	95%

**Description:** The goal is to reach 95 percent of all available Suomi NPP data processed by the Suomi NPP Production Environment within 180 minutes from the time of observation.

<b>Performance Measure:</b> Percentage of ice and snow products produced and delivered within targeted time	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	98.5%	98%	98%	98%	98%	98%	98%
<b>Description:</b> Percentage of imagery required daily by the National Ice Center (NIC) to generate weekly critical ice forecast and other ice products needed for safe marine transportation.							

<b>Performance Measure:</b> Transmission percentage rate of SARSAT distress alert and location information to search and rescue authorities within targeted time	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	96.3%	95%	95%	95%	95%	95%	95%
<b>Description:</b> Performance measure is important to beacon user customer group. The ability to deliver distress alerts in a timely fashion directly affects the chances of survival for the individual(s) in distress. Baseline performance was derived from historical data. The target performance is included in the Interagency SARSAT Operational Requirements document.							

<b>Performance Measure:</b> Percent of System Availability, "Up Time" for data archive and access	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	99%	99%	99%	99%	99%	99%	99%
<b>Description:</b> Each CLASS node operates 24 hours a day, seven days a week. The cumulative up-time for all nodes is targeted at 99%.							

**See Technical Adjustments for proposed Operational Phase Transfers to ensure that operational phase requirements currently captured in SGS and the GOES-R, Jason-3, and DSCOVR life cycle costs within the PAC account are adequately funded within Satellite and Product Operations.**

**PRODUCT DEVELOPMENT, READINESS AND APPLICATION (PDR&A)**

<http://www.star.nesdis.noaa.gov/star/index.php>

PDR&A promotes NOAA's investment in the acquisition and management of the nation's operational environmental satellites by offering state-of-the-art satellite-based information. PDR&A fulfills the critical role of combining NOAA's environmental satellite measurements with other available information to create fit for purpose data, products and services that various user communities can employ directly. PDR&A is key in providing the environmental intelligence that underpins NOAA's mission of science, service and stewardship.

PDR&A leads a comprehensive and rigorous calibration and validation of all data in NOAA's satellite operations to assure the accuracy of satellite products to meet user performance requirements. Additionally, PDR&A investigates advanced sensor technology for future NOAA satellite missions and tests new and innovative satellite-based products for NOAA operational systems. It is imperative to maintain the capacity of PDR&A to address the important science questions and issues that drive user-defined products and requirements. As NOAA prepares for the launches of JPSS and GOES series satellites in the next decade, a litany of new capabilities

are forthcoming. Using PDR&A's expertise, these capabilities will be translated into high-quality satellite products to be used to enhance the nation's ability to remotely monitor the Earth.

**Schedule and Milestones:** (Based on current launch schedules and data availability)

FY 2017-2021:

- Perform post-launch checkout of recently launched satellites

FY 2021: Complete development of JPSS-2 science algorithms

**Deliverables:** (Per the above schedule)

FY 2017-2021:

- Perform Instrument and / or Product Quality Assessment for recently launched satellites

FY 2021

- Deliver JPSS-2 Sensor Data Record/Environmental Data Record algorithm software packages to Ground System

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Number of products, applications, techniques, systems developed and/or transitioned to operations per year	15	14	14	14	14	14	14

**Description:** As new requirements for satellite data and environmental information are identified and understood, research is performed that leads to the creation of new information products, applications, processing techniques, and systems. To apply the research to operational needs, satellite information products that meet the requirements of customers are developed and tested (e.g., National Weather Service). After extensive evaluation, products that satisfy the requirements are transferred to operations for customer use.

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Number of sensors/instruments evaluated for quality and performance per year	31	31	31	31	31	31	31

**Description:** Advanced satellite instruments on board GOES-R, JPSS, and METOP satellites are fully assessed and characterized. Sensor quality on current NOAA and METOP satellites are updated to meet the requirements of customers (e.g., NWS) for use in numerical weather prediction and other environmental applications. Number of sensors/estimates may fluctuate with the launch of new satellites.

<b>Performance Measure:</b> Number of referred papers published per year	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	128	90	90	90	90	90	90
<b>Description:</b> To assure that research is valid, high-quality, and up-to-date, scientific results are published in peer-reviewed journals.							

**See Technical Adjustments for proposed Operational Phase Transfers to ensure operational phase requirements currently captured in the GOES-R and Jason-3 life cycle costs within the PAC account are adequately funded within PDR&A.**

**COMMERCIAL REMOTE SENSING REGULATORY AFFAIRS (CRSRA)**

[\(http://www.nesdis.noaa.gov/CRSRA/\)](http://www.nesdis.noaa.gov/CRSRA/)

NOAA’s authority to regulate private remote sensing systems is found in the National and Commercial Space Programs Act, which has been codified in Title 51 of the U.S. Code [“the Act”]. The Act provides that in consultation with other appropriate United States Government agencies, the Secretary of Commerce is authorized to issue regulations and to license private sector parties to operate private remote sensing space systems.<sup>1</sup> This statutory authority to issue licenses has been delegated from the Secretary to the NOAA Administrator and re-delegated to the Assistant Administrator for Satellite and Information Services.<sup>2</sup>

CRSRA manages interagency coordination review of license applications, amendments, and foreign agreements as well as enforcement and compliance of the licenses with periodic audits and on-site inspections. In addition, CRSRA directly supports President Obama’s 2012 National Space Policy to strengthen stability in space and improve space-based Earth and solar observations. The office serves on Presidential policy groups such as space transportation, marine domain awareness and the upcoming review and redrafting of National Space Policy Directives (NSPD). CRSRA is also an integral part of NSPD-27<sup>3</sup>, the President’s Commercial Remote Sensing Policy. CRSRA directly supports the Department of State during international engagement meetings on space policy at domestic and international locations.

**See the CRSRA Program Change for the proposed schedule and milestones, deliverables, performance goals and measurement data.**

**OFFICE OF SPACE COMMERCE (OSC)** [Formerly Office of Space Commercialization]

[\(http://www.space.commerce.gov\)](http://www.space.commerce.gov)

Due to the rapid change in the commercial space services arena, the prospects for private sector contribution to the United States’ space program have reached a heightened level in recent years. Recognizing the growing impact that space commerce has on our national interests, OSC was established by law (15 U.S.C. Sec 1511e) to serve as an advocate, resource and voice for the U.S. commercial space industry within the Executive branch.

<sup>1</sup> 51 U.S.C. § 60121 (a)(1)

<sup>2</sup> Department of Commerce Organization Order (DOO) 10-15 §3(01)(qq), Under Secretary of Commerce for Oceans and Atmosphere and Administrator of the National Oceanic and Atmosphere Administration. Department of Commerce Organization Order (DOO) 25-5 §10(2)(o), National Oceanic and Atmosphere Administration.

<sup>3</sup> <http://fas.org/irp/offdocs/nspd/remsens.html>

The National Space Policy issued by President Obama in 2010, the 2013 National Space Transportation Policy and the U.S. Commercial Space Launch Competitiveness Act of 2015 call on the U.S. Government to explore the use of commercial based space products and services to fulfill government needs and encourage a pro-growth environment for developing of commercial space industry through private sector investment and partnerships. Through OSC, the Department of Commerce (DOC) responds to these Administration priorities and legislative requirements to promote the U.S. Government as a customer of commercial space goods and services. As private sector roles evolve, OSC will continue to play a critical role in creating a robust and responsive U.S. commercial space industry that is internationally competitive.

Since 2005, the OSC budget has upheld a statutory responsibility to provide support to Federal Government organizations working on Space-based Positioning Navigation and Timing (PNT) policy. This includes the National Coordination Office for the National Executive Commitment for PNT, which is currently hosted at DOC. Established by presidential directive, this entity coordinates Global Positioning System (GPS) - related matters across multiple Federal agencies to ensure the system addresses national priorities as well as military requirements.

**Schedule and Milestones:**

FY 2017-2021:

- Participate in at least two major policy decisions per quarter

**Deliverables:**

- Increase opportunities for commercial solutions for key NOAA and other civil government data acquisition requirements
- Improve coordination between government and industry on space-related issues and enhanced engagement in inter-agency space-related policy activities
- Conduct commercial industry activities
- Facilitate an environment that enables increase space commerce investment
- Coordinate space commerce policy issues and actions within NOAA and DOC

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Number of major policy decisions supported to improve coordination or to enhance engagement on space-related activities	10	10	10	10	10	10	10
<b>Description:</b> The target represents specific actions planned to be executed during the year that deal with commercial space issues and industry studies of the market. In particular it tracks the number of major policy decisions supported to improve coordination between government and industry on space related issues or to enhance engagement in inter-agency space related policy activities.							

## **GROUP ON EARTH OBSERVATIONS (GEO)** (<http://www.noaa.gov/eos.html>)

The intergovernmental GEO is a voluntary partnership of 100 governments and 93 international organizations that provide a framework where partners collaborate globally in the Earth observation domain. GEO is implementing a Global Earth Observation System of Systems (GEOSS) through coordination of observing and information systems provided by the global GEO community. The goal is to improve our ability to assess the status and forecast information about the Earth's natural systems, and the interplay among them, to enable the development of sustainable solutions for global challenges. The activities of GEO directly support important Administration priorities including: (1) science-based decision making; (2) open data initiatives; (3) catalyze innovation and emergence of new businesses, products and services through the use of open data; and (4) increase international cooperation on the application of science and technology in the Earth observation domain.

NOAA supports the activities of the GEO Secretariat in Geneva, Switzerland, where GEO's activities are coordinated and implemented. Program resources also support the domestic cooperative activities of the USGEO Subcommittee, including analysis and planning of programmatic activities in support of the assessment of Federal Earth observation activities; coordination in support of fostering improved data management and interoperability; as well as the planning and coordination of preparations for U.S. Government participation in major meetings and events of GEO and liaison with the GEO Secretariat.

### **Schedule and Milestones:**

FY 2017-2021:

- Support the delivery of the US programmatic contributions to the GEO Work Programme and the participation of USGEO leadership in regular meetings of the GEO Executive Committee and annual GEO Plenary sessions

FY 2017

- Organization and hosting of the GEO-IV Plenary – meeting of the GEO decision-making body

### **Deliverables:**

- Support the participation of the U.S. lead expert contributors to key initiatives of the GEO Work Programme, including Marine Biodiversity Observation Network, GEO Global Water Sustainability, and AmeriGEOSS regional coordination working group
- Coordinate U.S. government positions and participation in major GEO meetings and events
- Develop reports for the Executive Office of the President as requested
- Coordinate activities to promote international engagement and coordination with stakeholders and outreach

**Performance Goals and Measurement Data:**

<b>Performance Measure</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Number of grants provided in support of annual US government participation in the implementation of GEOSS	1	1	1	1	1	1	1
<p><b>Description:</b> Through the grant to the GEO Trust Fund, NESDIS contributes to the funding of the GEO Secretariat operations. The successful delivery of the GEO Secretariat work products, in accordance with the GEO Rules of Procedure, constitutes the measure of the Secretariat's performance necessary for continuing the funding under the grant.</p>							

<b>Performance Measure</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Number of contracts and MOUs provided in support of national Earth observation portfolio	1	2	2	2	2	2	2
<p><b>Description:</b> Contracts and MOUs are critical to the support functions of USGEO. The NESDIS-funded USGEO Secretariat, among many other things, is responsible for providing meeting support for USGEO, analysis and planning of programmatic activities, as well as coordination of preparations for U.S. Government participation in major meetings and events of the intergovernmental Group on Earth Observations.</p>							

## **PROGRAM CHANGES FOR FY 2017:**

### **Satellite and Product Operations (SPO): NESDIS IT Security : (Base Funding: \$5,708,000 and 0 FTE; Program Change: +\$3,581,000 and 0 FTE):**

NOAA requests an increase of \$3,581,000 and 0 FTE for a total of \$9,289,000 and 0 FTE to improve data flow resiliency across NOAA's critical Information Technology (IT) systems and infrastructure. This request is part of a cross line office initiative with NOAA's Office of Chief Information Officer (OCIO) proposal 'Re-Architecting Data Systems for Mission Resiliency' (page MS-13, NESDIS-36).

#### **Proposed Actions:**

This cross line-office initiative will begin the process of modernizing and streamlining NOAA's IT systems. Together, these proposals will reduce labor and other costs needed to maintain many Federal Information Security Management Act (FISMA) high-impact systems as well as enhance system resilience and cyber security. The NESDIS components dovetail with the OCIO component by migrating NESDIS' FISMA high impact networks to NOAA OCIO enterprise services, enabling centralized authentication and automated deployment of security patches. The OCIO initiative will begin the assessment for, and implementation of, a robust enterprise architecture to reduce severity of or even eliminate disruption to the flow of critical NOAA data (e.g., weather forecasts, warnings) in the event that IT systems are compromised or fail. This NOAA-wide re-architecting effort will map specific system linkages, document interdependencies, and record configurations for systems that support NOAA's Primary Mission Essential Functions (PMEF).

Specifically, the SPO request of \$3,581,000 will support the following activities:

- Migrate NESDIS high impact systems to enterprise security services;
- Move NESDIS high impact networks into NOAA OCIO's secure active directory;
- Automate patching and continuous monitoring through NOAA-wide enterprise services; and
- Address current and predicted personnel shortages necessary for testing of patches, Department of Commerce Top-5 documentation, and Assessment and Authorization (A&A) requirements.

#### **Statement of Need and Economic Benefits:**

During the early autumn of 2014, an internet-sourced attack compromised several NOAA websites. When NOAA took the affected web servers and networks offline to contain the attack, unforeseen impacts had stopped the flow of critical satellite information to the National Weather Service. Although no weather forecasts or warnings were disrupted, the absence of a clear picture of the complex interrelationships and data interdependencies among NOAA IT systems—many of which are located in different line offices—was a key factor in the severity of the outage. This initiative will directly address and mitigate this identified risk.

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. Interruptions to one IT system can disrupt seemingly unrelated systems and cut-off or reduce the quality of warnings, information products and forecasts. The National Critical and High Impact systems that provide critical infrastructure services to the American people, which this increase will help secure, include:



- Environmental Satellite Processing Center (ESPC)
- Geostationary Operational Environmental Satellite (GOES) Ground Segment
- Polar-orbiting Operational Environmental Satellite (POES) Ground Segment
- Data Collection System (DCS)
- Constellation Observing System for Meteorology, Ionosphere & Climate (COSMIC)
- Jason
- Search and Rescue Satellite (SARSAT)
- NOAA Satellite Operations Facility (NSOF) Admin Local Area Network (LAN)
- Wallop Command and Data Acquisition (WCDAS) Admin LAN
- Fairbanks Command and Data Acquisition (FCDAS) Admin LAN

**Resource Assessment:**

The current resources for IT Security in SPO are insufficient to support the migration of NESDIS systems and networks to NOAA-wide enterprise services as proposed in the 'Re-Architecting Data Systems for Mission Resiliency' initiative.

**Schedule and Milestones:**

FY 2017

- Migrate NESDIS high impact systems to enterprise security services
- Move NESDIS high impact networks into NOAA OCIO's secure active directory
- Conduct annual penetration testing on all IT systems
- Continuously monitor all IT Systems
- Assess and authorize required IT Systems

FY 2018

- Automate NESDIS patching and continuous monitoring through NOAA enterprise services
- Conduct annual penetration testing on all IT systems
- Continuously monitoring of all IT Systems
- Assess and authorize required IT Systems

FY 2019

- Conduct annual penetration testing on all IT systems
- Continuously monitor all IT Systems
- Assess and authorize required IT Systems

FY 2020

- Conduct annual penetration testing on all IT systems
- Continuously monitor all IT Systems
- Assess and authorize required IT Systems

FY 2021

- Conduct annual penetration testing on all IT systems
- Continuously monitor all IT Systems
- Assess and authorize required IT Systems

**Deliverables:**

NESDIS use of enterprise-wide automated patching and continuous monitoring

**Performance Goals and Measurement Data:**

<b>Performance Measure (NESDIS Mission Systems):</b> Number of IT Mission Systems supporting Primary Mission Essential Functions (PMEF)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	11	12	12	12	12
<b>Without Increase</b>	10	10	10	10	10	10	10

**Description:** This measure tracks improvement of security controls through implementation of common architecture and security modernization of NESDIS systems that support DOC PMEFs. Recent cyber-threats required NOAA to take certain systems offline to perform unscheduled maintenance activities. This unscheduled maintenance activity had unforeseen mission impacts that interrupted the timely flow of some PMEF information to the National Weather Service (NWS), Department of Defense (DOD), European Organization for the Exploitation of Meteorological Satellites (EUMESTAT), NESDIS Satellite Analysis Branch (SAB), and NESDIS Naval Ice Center (NIC). To address this risk, NESDIS will use these funds to improve documentation of data flow dependencies and upgrade and consolidate mission system components to a secure configuration. These changes will improve system robustness and resiliency to the effects of cyber-threats.

<b>Performance Measure (NESDIS PMEF):</b> Percent of System Availability, "Up Time" for satellite command and control, data received, processed, and distributed	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	99%	99%	99%	99%	99%
<b>Without Increase</b>	98%	98%	98%	98%	98%	98%	98%

**Description:** This measure tracks the "Up Time" or operational availability of the NESDIS Primary Mission Essential Functions (PMEF) to receive satellite instrument data, generate products and deliver to the primary customer (NWS).

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** NESDIS  
**Sub-program:** Office of Satellite and Product Operations  
**Program Change:** NESDIS IT Security (SPO)

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$32,248
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>0</u>	<u>32,248</u>
12	Civilian personnel benefits	0	7,555
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	650
22	Transportation of things	0	3,898
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	1,300
23.3	Communications, utilities and miscellaneous charges	0	3,713
24	Printing and reproduction	0	15
25.1	Advisory and assistance services	0	8,600
25.2	Other services	3,581	63,458
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	1,349
31	Equipment	0	638
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>3,581</u>	<u>123,424</u>

Due to financial system limitations, the object class detail for the Total Program reflects the SPO PPA.

**Satellite and Product Operations (SPO): DSCOVR Operations: (Base Funding: \$556,000 and 0 FTE; Program Change: +\$847,000 and 0 FTE):** After an adjustment of \$556,000 for the FY 2017 Operational Phase Transfer, NOAA requests an increase of \$847,000 and 0 FTE for a total of \$1,403,000 and 0 FTE to support operations of the DSCOVR satellite.

**Proposed Actions:**

NOAA requests \$847,000 to fund DSCOVR operations. The DSCOVR satellite was successfully handed over from NASA to NOAA for operational command and control on October 28, 2015 and is currently operated from the NOAA Satellite Operations Facility (NSOF) in Suitland, MD. The anomalies on the DSCOVR satellite, which have been more frequent than anticipated, have resulted in an increase in the day to day anomaly support required to continue the operation of the DSCOVR satellite at NSOF.

The Space Weather Prediction Center (SWPC) is expected to begin using data from DSCOVR in its space weather forecasts in spring 2016. Without this request, SPO will not have the resources to conduct timely recovery actions when an anomaly occurs. The delays in bringing the spacecraft and instruments back online after anomalies are the main threat to SWPC's ability to warn of incoming storms and gauge their severity. This request mitigates the risk of a delay or disruption in the flow of real-time solar wind data due to anomalies.

**Statement of Need and Economic Benefit:**

DSCOVR allows for the continuity of solar wind data and is planned to replace NASA's Advanced Composition Explorer (ACE) research satellite as the Nation's operational space weather satellite. NOAA will use DSCOVR data to issue space weather forecasts and alerts of approaching geomagnetic storms with potentially calamitous consequences for terrestrial electrical grids, communications, Global Positioning System (GPS) navigation, air travel, satellite operations, and human spaceflight.

**Resource Assessment:**

Given that the DSCOVR satellite has had more frequent anomalies than anticipated, remaining at the current funding level increases risk to SWPC's ability to issue space weather forecasts and warnings. Current resources are insufficient to address the requirement for additional anomaly support to identify and recover from the expected anomalies on the DSCOVR satellite. Coupled with the FY 2017 request in the DSCOVR PAC PPA, this funding will ensure that NOAA has the anomaly and engineering support needed to identify and recover from anomalies.

**Schedule and Milestones:**

FY 2017-2021:

- 24/7 operations and anomaly support for the DSCOVR Satellite

**Deliverables:**

- Provide timely access to operational solar wind data for geomagnetic storm warnings

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Error in Geomagnetic Storm magnitude warning (G-scale)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	±0.5	±0.5	±0.5	±0.5	±0.5
<b>Without Increase</b>	N/A	N/A	±1.5	±1.5	±1.5	±1.5	±1.5
<p><b>Description:</b> This metric is a Space Weather Prediction Center (SWPC) performance measure that represents the predicted magnitude of an incoming geomagnetic storm detected by the DSCOVR satellite at the L1 orbital location. Prediction of the magnitude depends on an accurate measurement of the solar wind speed, density, and temperature.</p> <p>The metrics for this performance measure assume the NASA ACE spacecraft is not operating in real-time mode, as is currently planned once DSCOVR becomes fully operational.</p>							

<b>Performance Measure:</b> Percentage of warnings issued prior to geomagnetic storm	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	100%	100%	100%	100%	100%
<b>Without Increase</b>	N/A	N/A	80%	80%	80%	80%	80%
<p><b>Description:</b> This metric is a SWPC performance measure that ensures issuance of warnings for all geomagnetic storms.</p> <p>Once SWPC receives real-time data regarding geomagnetic storm arrival, the alert is posted on their website and email alerts are sent to customers. SWPC will also contact high impact customers such as FEMA, Coast Guard, power distributors, airlines, etc.</p> <p>This metric assumes that the DSCOVR satellite will continue to experience unexpected shutdowns of the solar wind measurement instrumentation, but will be unable to recover from them as quickly without the requested increase. This would leave SWPC unable to issue warnings of incoming geomagnetic storms about 20% of the time.</p>							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** NESDIS  
**Sub-program:** Environmental Satellite Observing Systems  
**Program Change:** SPO DSCOV R Operations

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$32,248
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>0</u>	<u>32,248</u>
12	Civilian personnel benefits	0	7,555
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	650
22	Transportation of things	0	3,898
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	1,300
23.3	Communications, utilities and miscellaneous charges	0	3,713
24	Printing and reproduction	0	15
25.1	Advisory and assistance services	0	8,600
25.2	Other services	847	63,458
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	1,349
31	Equipment	0	638
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>847</u>	<u>123,424</u>

Due to financial system limitations, the object class detail for the Total Program reflects the SPO PPA.

**Product Development, Readiness & Application (PDR&A): PDR&A: (Base Funding: \$33,954,000 and 88 FTE; Program Change: +\$316,000 and 0 FTE)**: NOAA requests an increase of \$316,000 and 0 FTE for a total of \$34,270,000 and 88 FTE. As NOAA approaches the planned launches of JPSS and GOES-R, this funding request is needed to support the transfer of satellite observations into improved products and services for use in forecasts and warnings.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** NESDIS  
**Sub-program:** Environmental Observing Satellite Systems  
**Program Change:** PDR&A

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$11,515
11.3	Other than full-time permanent	0	109
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	105
11.9	Total personnel compensation	0	11,729
12	Civilian personnel benefits	0	3,594
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	213
22	Transportation of things	0	4
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	2,320
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	14
25.1	Advisory and assistance services	0	0
25.2	Other services	316	11,745
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	125
31	Equipment	0	722
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	3,804
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	316	34,270



**Commercial Remote Sensing Regulatory Affairs (CRSRA): CRSRA: (Base Funding: \$1,000,000 and 6 FTE; Program Change: +\$1,065,000 and 1 FTE):** NOAA requests an increase of \$1,065,000 and 1 FTE for a total of \$2,065,000 and 7 FTE to enable CRSRA's statutory authority to regulate private remote sensing systems.

**Proposed Actions:**

NOAA requests \$1,065,000 to fund compliance oversight activities that are required to be conducted by CRSRA. The increase is needed to regulate a February 2015 change in operations allowing U.S. commercial satellite imagery providers to sell improved resolution imagery commercially. This funding will allow CRSRA to administer and fulfill its statutory function, delegated by the Secretary of Commerce, to regulate private remote sensing systems. This request will be allocated to the following activities:

- Processing license applications, amendments or waivers;
- Carrying out enforcement activities to address substantial violations of U.S. laws, regulations, and NOAA-issued licenses;
- Conducting audits to verify compliance with licenses, financial information, and plans and procedures to comply with data collection restrictions, operational limitations, and data protection plans;
- Performing on-site inspections to ensure that ground station sites, both domestic and foreign, are being operated in a manner that is consistent with NOAA-issued licenses and the national security interests of the U.S.; and
- Implementing shutter control in support of decisions to limit data collection and/or distribution due to national security or foreign policy concerns.

**Statement of Need and Economic Benefits:**

CRSRA is the sole entity to develop and administer regulations for any private remote sensing space system that is capable of sensing the Earth's surface. NOAA regulates 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. Therefore, one of the most critical roles for CRSRA is to ensure licensee compliance with applicable U.S laws, regulations and NOAA-issued licenses.

**Resource Assessment:**

The resources for this activity are described in the CRSRA narrative.

**Schedule and Milestones:**

FY 2017

- Examine methodology for licensing of private space systems and determine if the existing license format is relevant or needs to be updated to better address changes in space systems and their operations
- Award contract for the Federally Funded Research and Development Centers (FFRDC)
- Conduct at least 85 inspections annually
- Begin full assessment analysis of datasets related to commercial remote sensing satellite and shutter control activities
- Review regulations and update if appropriate; republish any new regulations

FY 2018

- Conduct at least 85 inspections annually
- Review regulations and update if appropriate; republish any new regulations

FY 2019

- Conduct at least 85 inspections annually
- Review regulations and update if appropriate; republish any new regulations

FY 2020

- Conduct at least 85 inspections annually
- Review regulations and update if appropriate; republish any new regulations

FY 2021

- Conduct at least 85 inspections annually
- Review regulations and update if appropriate; republish any new regulations

**Deliverables:**

Licensing deliverables

- Issuance of new licenses, waivers and or amendments to licenses
- Review and approval of foreign agreements and data protection plans

Compliance deliverables

- Quarterly and annual audits
- Annual on-site inspections

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Perform licensing actions in accordance with the National and Commercial Space Programs Act	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	25+	25+	25+	25+	25+
<b>Without Increase</b>	21	15	15	15	15	15	15
<b>Description:</b> Licensing actions include new licenses, the amendment of an existing license (actions on both must be taken within 120 days by law), review, and approval of any waiver to a license or a foreign agreement (60 days).							

<b>Performance Measure:</b> Perform paper audits in accordance with the National and Commercial Space Programs Act	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	75+	75+	75+	75+	75+
<b>Without Increase</b>	63	65	60	60	60	60	60
<b>Description:</b> Audits are the quarterly and annual review of records, licenses, data protection plans and agreements. The audits and inspections serve as the verification for enforcement.							

<b>Performance Measure:</b> Perform Site Inspections in accordance with the National and Commercial Space Programs Act	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	85+	85+	85+	85+	85+
<b>Without Increase</b>	41	28	25	25	25	25	25
<p><b>Description:</b> The number of onsite inspections would be significantly reduced and vary depending on where domestically and/or globally we are able to travel.</p> <p>Inspections are the annual onsite inspection of a company and any domestic or foreign ground station associated with the collection of satellite data. The audits and inspections serve as the verification for enforcement.</p>							

**PROGRAM CHANGE PERSONNEL DETAIL**  
**(Dollar amounts in thousands)**

**Budget Program:** NESDIS  
**Sub-program:** Environmental Observing Satellite Systems  
**Program Change:** CRSRA

<b>Title:</b>	<b>Location</b>	<b>Grade</b>	<b>Number of Positions</b>	<b>Annual Salary</b>	<b>Total Salaries</b>
Program Analyst	Silver Spring, MD	12	1	82,840	82,840
Subtotal			<u>1</u>		<u>82,840</u>
less Lapse		25%	<u>0</u>		<u>20,710</u>
Total full-time permanent (FTE)			1		62,130
2016 Pay Adjustment (1.3%)					808
2017 Pay Adjustment (1.6%)					<u>1,007</u>
TOTAL					63,945

**Personnel Data**

	<u>Number</u>
Full-Time Equivalent Employment	
Full-time permanent	1
Other than full-time permanent	0
Total	<u>1</u>
Authorized Positions:	
Full-time permanent	1
Other than full-time permanent	0
Total	<u>1</u>

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** NESDIS  
**Sub-program:** Environmental Observing Satellite Systems  
**Program Change:** CRSRA

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$64	\$695
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	64	695
12	Civilian personnel benefits	17	210
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	200	280
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous	0	12
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	603	603
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	125	208
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	51	52
32	Lands and structures	5	5
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	1,065	2,065

**Office of Space Commerce (OSC): OSC: (Base Funding: \$600,000 and 5 FTE; Program Change: +\$1,400,000 and 1 FTE):** NOAA requests an increase of \$1,400,000 and 1 FTE for a total of \$2,000,000 and 6 FTE to increase the capacity of its Office of Space Commerce to evaluate commercial opportunities for NOAA, including commercial data buys, and to fulfill its expanded statutory functions.

**Proposed Actions:**

OSC will use the requested funds to execute NOAA's commitment to encourage a robust and transparent marketplace for commercial space businesses to provide environmental data and other space services to NOAA. The NOAA Commercial Space Policy<sup>4</sup> designates the Office of Space Commerce as a single point of entry for commercial providers to streamline the process for easier engagement with NOAA. This request will provide OSC with the resources needed to execute its new role as the NOAA entry point for commercial sector engagement.

With this funding request, OSC will:

- Collect and publish NOAA requirements, standards and other information that commercial providers need to enter the marketplace for NOAA;
- Organize industry workshops and meetings to discuss business models with commercial providers;
- Lead initial feasibility analysis of commercial space solutions to meet NOAA observational requirements;
- Travel to vendor sites, partners, stakeholders, and relevant conferences to facilitate communication, guidance and engagement; and
- Hire new personnel and fund associated operating expenses.

Beyond facilitating the evaluation and purchase of commercial data at NOAA, this funding level enables OSC to continue to fulfill its statutory functions as related to the National Coordination Office (NCO). The request will support OSC's longstanding mandate to host and fulfill staffing commitments to the NCO. Remaining at current resource levels may require cuts that will leave the current NCO staff without a base of operations to execute their responsibilities under the U.S. Space-Based Positioning, Navigation, and Timing Policy (NSPD-39).

**Statement of Need and Economic Benefits:**

NOAA stands to gain significant economic benefits from the use of commercial space services as a supplement to its development and operation of government owned satellite systems. Such benefits include cost savings from not having to operate and maintain commercial satellites, avoidance of cost overruns due to schedule delays in satellite programs, predictable budgeting, and potential acquisition of new data sets at lower unit costs. Adding commercial data to NOAA's portfolio of inputs will also mitigate risks of data continuity gaps and should lead to improved forecasts, which would bring U.S. economic benefits in terms of property and lives saved from extreme weather events. Encouraging the development of a new industry and market for commercial satellite data will also generate U.S. economic benefits in terms of jobs and revenues.

Commercial providers and financial markets are seeking positive signals from NOAA that it is prepared to engage in commercial partnerships. This investment to equip OSC with the appropriate resources to serve as NOAA's "front door" for commercial vendors is essential to sending a strong signal that NOAA is serious about commercial space solutions.

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<sup>4</sup> [http://www.corporateservices.noaa.gov/ames/administrative\\_orders/chapter\\_217/217-109.html](http://www.corporateservices.noaa.gov/ames/administrative_orders/chapter_217/217-109.html)

**Resource Assessment:**

Current resources are insufficient for OSC to fulfill its new role as the NOAA entry point for commercial space providers as defined by the NOAA Commercial Space Policy.

**Schedule and Milestones:**

FY 2017

- Hire full time director
- Organize 1 workshop
- Assess technical feasibility of at least one commercial data proposal
- Renew Memorandum of Agreements and contracts as needed to support NCO operations

FY 2018-2021:

- Organize 1-2 workshops annually
- Assess technical feasibility of at least one commercial data proposal annually
- Maintain Memorandum of Agreements and contracts needed to support NCO operations

**Deliverables:**

- Online publication of NOAA requirements, standards, and other information needed by commercial data providers and required by NOAA Commercial Space Policy
- Report on industry workshop
- Report on technical assessment
- National Coordination Office MOA's/contracts
- Fulfill statutory functions to support of the National Coordination Office
- Support Commercial Weather Data Pilot efforts to purchase and evaluate commercial satellite data products

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Ability to serve as NOAA's entry point for commercial data providers	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	100%	100%	100%	100%	100%
<b>Without Increase</b>	N/A	N/A	10%	10%	10%	10%	10%
<b>Description:</b> This measure represents an overall rating of OSC's responsiveness to commercial space service providers seeking to do business with NOAA. OSC facilitates meetings with NOAA Line Offices/leadership, performs technical assessments of proposed commercial capabilities, provides needed data and information to the industry, investigates business models, etc.							

<b>Performance Measure:</b> Ability to provide support to the National Coordination Office	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	100%	100%	100%	100%	100%
<b>Without Increase</b>	N/A	N/A	10%	10%	10%	10%	10%
<b>Description:</b> Without the increase, the percentages represent OSC's overall ability to accomplish required actions.							

<b>Performance Measure:</b> Number of tools (workshops, reports, requirements, etc.) developed by NOAA to facilitate commercial space industry into marketplace	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	2	3	4	5	6
<b>Without Increase</b>	1	1	1	1	1	1	1
<b>Description:</b> NOAA will develop, distribute and implement tools that meet the needs of the commercial space industry. Providing these tools sends a positive signal to industry that NOAA increasingly understands and is prepared to engage in commercial partnerships. OSC identifies commercial solutions for key NOAA and other civil government data acquisition requirements. OSC also acts as a broad industry advocate within the Executive Branch to ensure the Federal Government uses commercially available space goods and services to meet its requirements, avoids legal and regulatory impediments, and does not compete with the U.S. commercial space industry. This helps to ensure NOAA's improved ability to understand capabilities and needs of the industry.							



**PROGRAM CHANGE PERSONNEL DETAIL**  
(Dollar amounts in thousands)

**Budget Program:** NESDIS  
**Sub-program:** Environmental Satellite Observing Systems  
**Program Change:** Office of Space Commerce

<b>Title:</b>	<b>Location</b>	<b>Grade</b>	<b>Number of Positions</b>	<b>Annual Salary</b>	<b>Total Salaries</b>
Program Analyst	Washington, DC	IV	1	128,701	128,701
Subtotal			<u>1</u>		<u>128,701</u>
less Lapse		25%	<u>0</u>		<u>32,175</u>
Total full-time permanent (FTE)			1		96,526
2016 Pay Adjustment (1.3%)					1,255
2017 Pay Adjustment (1.6%)					<u>1,564</u>
<b>TOTAL</b>					<u>99,345</u>

**Personnel Data**

Full-Time Equivalent Employment

- Full-time permanent
- Other than full-time permanent
- Total

Number

1

0

1

Authorized Positions:

- Full-time permanent
- Other than full-time permanent
- Total

1

0

1

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** NESDIS  
**Sub-program:** Environmental Satellite Observing Systems  
**Program Change:** Office of Space Commerce

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$99	\$487
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	99	487
12	Civilian personnel benefits	33	162
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	25	25
22	Transportation of things	0	0
23.1	Rental payments to GSA	45	60
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	5
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	640	640
25.3	Purchases of goods & services from Gov't accounts	0	5
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	537	561
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	11	15
31	Equipment	10	40
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	1,400	2,000

**APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES**  
**SUB-PROGRAM: NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION** [Formerly  
National Environmental Information Office]  
(<https://www.ncei.noaa.gov>)

The National Centers for Environmental Information (NCEI) is the official source for historical and near-real time atmospheric and space weather, climate, coastal, oceanographic, and geophysical environmental data and information. NCEI data and information products include decadal, annual, monthly, weekly, and daily U.S. and global weather summaries and climate reports; assessments of billion-dollar disasters; the World Ocean Atlas; and the World Magnetic Model, including global as well as national data. Access to reliable and accurate long-term records is critical to satisfying the Nation's wide range of business, education, and government needs, including policies and decisions that have an impact on water and energy management, manufacturing, transportation, defense, food production, public health, and many other socio-economic issues. NCEI's authoritative data and information puts today's events into historical perspective, allowing decision makers to make confident, data- and information-driven determinations about trends, such as droughts or snowstorms, providing for more cost effective appropriations.

NCEI's headquarters are in Asheville, NC, with major presences in Boulder, CO; Stennis Space Center, MS; and Silver Spring, MD. NCEI works with many partners, including all NOAA Line Offices as well as Cooperative Institutes, state and Federal agencies, national and international contributors and users of NCEI data. NCEI's centers and divisions include:

- Center for Coasts, Oceans and Geophysics advances and enables environmental science and decision making for resilient ocean and coastal communities, the Arctic, and space weather through derived products, assessments, and information services in support of customer requirements.
- Center for Weather and Climate provides U.S. and global retrospective weather and climate data for decision making through use-inspired applied science, products and services, and authoritative assessments and monitoring.
- Data Stewardship Division provides data preservation and access services that enable NOAA, other government agencies, and the public to make full use of the Nation's multi-billion dollar investment in satellite and in-situ observations. NCEI maintains the Nation's archive of environmental information, as well as international data holdings through the World Data System. NCEI leverages data portals and cloud services to maximize the availability and accessibility of official, archived records.
- Coastal Data Development conducts integrated scientific analyses of coastal and marine environmental data sets to better understand historical trends, anomalies, and the frequency of event occurrences.
- Reference Environmental Data Records (REDRs) transform complex, long-term data into consistent use-inspired, operational products to meet the needs of government, academia, and U.S. industry.
- Regional Climate Services (RCS) includes six RCS Directors and six Regional Climate Centers working together to ensure that broad national comprehensive data and information, products, and services are available to public and private sector users at the local, state, regional, and Federal levels.

**See the NCEI Program Change for the proposed schedule/milestones, deliverables, performance goals and measurement data, and the budget profile.**

**See Technical Adjustments for proposed operational phase transfers to ensure operational phase requirements currently captured in GOES-R, Jason-3, and DSCOVR life cycle costs within the PAC account are adequately funded within the NCEI.**

## **PROGRAM CHANGES FOR 2017:**

**National Centers for Environmental Information (NCEI): NESDIS IT Security (NCEI): (Base Funding: \$0 and 0 FTE; Program Change: +\$1,261,000 and 0 FTE):** NOAA requests an increase of \$1,261,000 and 0 FTE for a total of \$1,261,000 and 0 FTE to improve data flow resiliency across NOAA's critical Information Technology (IT) systems and infrastructure. This request is part of a cross-line office initiative with NOAA's Office of Chief Information Officer (OCIO) proposal 'Re-Architecting Data Systems for Mission Resiliency' (page MS-13, NESDIS-15).

### **Proposed Actions:**

This cross-line office initiative will begin the process of modernizing and streamlining NOAA's IT systems. Together, these proposals will reduce labor and other costs needed to maintain many Federal Information Security Management Act (FISMA) high-impact systems as well as enhance system resilience and cyber security. The NESDIS components dovetail with the OCIO component by migrating NESDIS' FISMA high impact networks to NOAA OCIO enterprise services, enabling centralized authentication and automated deployment of security patches. The OCIO proposal will begin the assessment for and implementation of a robust enterprise architecture to reduce severity of or even eliminate disruption to the flow of critical NOAA data (e.g., weather forecasts, warnings) in the event that IT systems are compromised or fail. This NOAA-wide re-architecting effort will map specific system linkages, document interdependencies, and record configurations for systems that support NOAA's Primary Mission Essential Functions (PMEF).

Specifically, the NCEI request of \$1,261,000 will:

- Integrate three NESDIS moderate impact systems into a single security boundary, enabling NCEI to reduce organizational and architectural complexity, identify cost savings and become a single FISMA moderate system;
- Allow NCEI to identify and mitigate vulnerabilities affecting the availability, integrity and delivery of NOAA's data, an effort that will also yield a unified, resilient centralized NOAA NESDIS Enterprise mission IT architecture;
- Address security vulnerabilities and incorporate available Enterprise web services for public-facing NCEI customer applications;
- Automate continuous monitoring, detection and patching through NOAA-wide Enterprise services; and
- Allow NCEI to sustain current operations at appropriate levels throughout infrastructure integration.

### **Statement of Need and Economic Benefits:**

NOAA uses many 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 can threaten NOAA's ability to collect and process environmental data, analyze and model weather, and disseminate the information and warnings that save lives and preserve property.

During the early autumn of 2014, an internet-sourced attack compromised several NOAA websites. When NOAA took the affected web servers and networks offline to contain the attack, unforeseen impacts stopped the flow of critical satellite information to the National Weather Service. Although no weather forecasts or warnings were disrupted, the absence of a clear picture of the complex interrelationships and data interdependencies among NOAA IT systems—

many of which are located in different line offices—was a key factor in the severity of the outage. This initiative will directly address and mitigate this identified risk.

Access to reliable and accurate long-term records of environmental data and information is critical to satisfying the Nation's wide range of business, education, and government needs related to national security, the economy, the environment, and public safety. This includes policies and decisions that have an impact on water and energy management, manufacturing, transportation, food production, public health, and many other socio-economic issues that depend on quality Earth and space weather, climate, ocean, coastal, and geophysical data records and information.

**Resource Assessment:**

There are currently no resources available in the NCEI PPA to support this initiative.

**Schedule and Milestones:**

FY 2017-2021: Maintain cyber security of moderate impact systems

FY 2017

- Merge three FISMA NCEI systems (Documentation)
- Move NESDIS NCEI moderate impact systems into NOAA OCIO's secure active directory
- Conduct annual penetration testing on all IT systems
- Continuously monitor IT Systems
- Assess and authorize required IT Systems
- Develop integration plan with NOAA Web Operations Center (WOC)
- Re-code 10%-20% of NCEI's public facing applications

FY 2018

- Merge three FISMA NCEI systems (Documentation and Processes)
- Automate NESDIS patching and continuous monitoring through NOAA enterprise services
- Conduct annual penetration testing on all IT systems
- Increase continuous monitoring of all IT Systems
- Assess and authorize required IT Systems
- Re-code 20% - 30% of NCEI's public facing applications
- Migrate pilot web application(s) to WOC enterprise
- Migrate Mission Systems to secure and available SGS Enterprise Services

FY 2019

- Merge three FISMA NCEI systems (Processes)
- Conduct annual penetration testing on all IT systems
- Increase continuous monitoring of all IT Systems
- Assess and authorize required IT Systems
- Re-code 30%-40%% of NCEI's public facing applications
- Migrate 7% of targeted web application(s) to WOC enterprise
- Migrate Mission Systems to secure, available SGS Enterprise Services

FY 2020

- Merge three FISMA NCEI systems (Cleanup)
- Conduct annual penetration testing on all IT systems
- Increase continuous monitoring of all IT Systems
- Assess and authorize required IT Systems
- Code sustainment for 40% of NCEI's public facing applications
- Migrate 15% of targeted web application(s) to WOC enterprise
- Migrate mission systems to secure, available SGS Enterprise Services

FY 2021

- Conduct annual penetration testing on all IT systems
- Increase continuous monitoring of all IT Systems
- Assess and authorize required IT Systems
- Code sustainment for 40% of NCEI's public facing applications
- Migrate 25% of targeted web applications to WOC Enterprise
- Migrate mission systems to secure, available OSGS Enterprise Services

**Deliverables:**

FY 2017–FY 2021:

- Timely identification and remediation of new security vulnerabilities
- NCEI implementation and use of enterprise-wide automated patching and continuous monitoring capabilities: Active Directory, Enterprise Cyber Monitoring Operations (ECMO) - FY 2017 and beyond
- 25% of Secured Public Facing Customer Web Services accessible from the NOAA WOC
  - Pilot application delivered FY 2018
  - Completed migration is dependent on availability/complexity of WOC services
- A single NCEI Mission System supported by SGS Enterprise Services with the rate of migration dependent on their availability and complexity:
- Initial capability – End of FY 2018
- Completely integrated – End of FY 2020

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Integrate 3 NCEI Mission Federal Information Security Management Act Systems under a single secure system	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	3	2	2	1	1
<b>Without Increase</b>	N/A	N/A	3	3	3	3	3
<b>Description:</b> Reducing the number of redundant long-term information preservation (Archive) systems will decrease the cost for operations, maintenance and sustainment. The reduced number of Archive systems will increase maintenance and security efficiency, reduce exposure to cyber threats, and enhance the ability to detect/respond to cyber-attacks, resulting in a more robust system.							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** NESDIS  
**Sub-program:** NCEI  
**Program Change:** NESDIS IT Security (NCEI)

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$23,901
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	23,901
12	Civilian personnel benefits	0	6,920
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	573
22	Transportation of things	0	29
23.1	Rental payments to GSA	0	4,559
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	713
24	Printing and reproduction	0	101
25.1	Advisory and assistance services	0	0
25.2	Other services	1,261	23,952
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	180
31	Equipment	0	189
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	2,361
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	1,261	63,478

Due to financial system limitations, the object class detail for the Total Program reflects the NCEI PPA.



**APPROPRIATION ACCOUNT: PROCUREMENT, ACQUISITION, AND CONSTRUCTION  
SUB-PROGRAM: NESDIS SYSTEMS ACQUISITION**

NOAA's satellite portfolio provides the backbone for the operational data products that support NOAA's Weather-Ready Nation, climate adaptation and mitigation, healthy oceans, and resilience coastal communities and ecosystems goals. NOAA satellite data drives critical decision-making and impacts national security and various sectors of the economy including, agriculture, transportation, energy, construction, infrastructure, emergency management, and hazard mitigation. NOAA maintains two primary constellations of environmental satellites that produce crucial set of observations: polar-orbiting and geostationary satellites.

The FY 2017 request enables NOAA satellite programs to continue to meet milestones on time and on budget, as well as to plan for future programs and comprehensive engineering solutions.

**GEOSTATIONARY SYSTEMS - R SERIES (GOES-R)**

GOES-R observations will provide coverage of the western hemisphere from a geostationary orbit, allowing continuous monitoring from the same angle during the tracking/detection of severe storms, tropical cyclones, volcanic eruptions, fire hot spots, cloud and atmospheric moisture changes, lightning, currents flow dynamics, and atmospheric smoke and dust.

The GOES-R Series program will provide end-to-end system development and integration through the acquisition and deployment of the space, ground system, and satellite launch. NOAA will maintain two operational GOES satellites designated as GOES East and GOES West, and will further maintain one on-orbit spare positioned midway between them. This on-orbit spare allows NOAA to quickly replace a failed satellite and ensure continuous coverage within the geostationary orbit.

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, with the first satellite slated to launch in late 2016, will provide significant enhancements to all operational users of geostationary observations, in particular NWS. For example, the GOES-R Geostationary Lightning Mapper (GLM), which maps both cloud-to-ground and cloud-to-cloud lightning strikes, will be the first operational satellite lightning detection system on a geostationary satellite. The increased quantity, quality, and accuracy of satellite data that GOES-R will provide will enable NWS to issue improved and timely weather advisories to the public, protecting life and property.

GOES-R will provide data that will enhance a number of NOAA products and services, including:

- Cloud images and precipitation estimates for hurricanes and other coastal storms;
- NOAA Coast Watch sea surface temperature (SST) products for locating fish as well as protected marine species;
- New research products on ocean surface currents that support both ecosystem management and marine navigation safety;
- SST and precipitation data for the Nation's Climate Reference Network;
- Images of the United States and adjacent ocean areas to enable the detection, tracking, and intensity changes of hurricanes and other major weather events; and
- Improved numerical weather prediction models and flood/drought assessments

**See the GOES-R Program Change for the proposed schedule/milestones, deliverables, performance goals and measurement data, launch dates, and the budget profile.**

**See Technical Adjustments for proposed operational phase transfers to ensure operational phase requirements currently captured in the GOES-R life cycle costs within the PAC account are adequately funded within the ORF offices.**

### **SATELLITE ALTIMETRY MISSION – JASON-3**

Jason-3, the newest Earth observation satellite in the Jason series, is designed to maintain the Nation's satellite observations of global sea surface height, which began in 1992 with the TOPEX/Poseidon mission. The Jason missions use radar altimetry sensors, which measure the time a signal takes to bounce off the ocean surface and return to the satellite, to provide global measurements of sea surface height. By using space-based radar altimetry, these satellites provide the most accurate global measurement of sea level, wave height and ocean surface wind speeds, every 10 days.

Jason satellite data support scientific, commercial, and operational applications and are critical for fisheries managers, marine navigators, researchers, long-range planners and others that rely on real time marine and weather forecasts for public safety, commerce and environmental purposes. Specifically, data from Jason-3 supports:

- Hurricane intensity forecasting: Measurements of upper ocean heat content are critical to forecasting intensity of hurricanes as they approach the U.S. East and Gulf Coasts.
- Coastal forecasting: The Jason series provides more accurate measurements of local coastal sea level changes compared to previous satellites and other tools. These measurements help communities prepare for and respond to oil spills, harmful algal blooms, and climate-related impacts.
- Understanding of ocean variability: Climate records that reveal decadal, seasonal and inter-annual variability in the ocean help elucidate fishery regime changes, El Nino events, and other phenomena.

As with Jason-2, Jason-3 is an international cooperative mission, in which NOAA is partnering with NASA, the Centre Nationale d'Etudes Spatiales (CNES, France's governmental space agency) and European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT).

**See the Jason-3 Program Change for the proposed schedule and milestones, deliverables, performance goals and measurement data, and the budget profile.**

**See Technical Adjustments for proposed operational phase transfers to ensure operational phase requirements currently captured in the Jason-3 life cycle costs within the PAC account are adequately funded within the ORF offices.**

### **JOINT POLAR SATELLITE SYSTEM (JPSS)**

JPSS provides meteorological data and observations of atmosphere, ocean, and land for short-term (0-3 days), mid-range (3-7 days), seasonal, and long-term monitoring and forecasting. Data from civilian polar-orbiting satellites are the primary input (approximately 85%) for all Numerical Weather Prediction (NWP) models. Most important, 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.

Continuing support for the JPSS satellite system, which would extend the more than 30-year record of polar observations, will enable scientists and forecasters to monitor and predict weather patterns with greater accuracy and to study long-term trends. Information from JPSS 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. The global measurements gathered by JPSS meet NOAA's requirement to provide global environmental data that are critical for:

- Medium range weather forecasts;
- Supporting operational forecasts in Alaska;
- Severe storm and flood warnings;
- Tropical cyclone and hurricane reconnaissance and warnings;
- Hydrologic forecasts;
- Ocean surface temperature, ocean color for ocean monitoring e.g. reef conditions, harmful algal bloom warnings etc.;
- Aviation forecasts (domestic, military, and international);
- Ice monitoring and forecasting;
- Ozone monitoring;
- Environmental air quality monitoring;
- Detection and analysis of wild fires and volcanic eruptions including volcanic ash warnings for Aviation Safety;
- Short-term and mesoscale forecasts;
- Seasonal and inter-annual climate forecasts;
- Decadal-scale monitoring of climate variability;
- Assessment of long-term global environmental change

**See the JPSS Program Change for the proposed schedule and milestones, deliverables, performance goals and measurement data, and the budget profile.**

### **POLAR FOLLOW ON (PFO)**

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. The full PFO/JPSS-3 and PFO/JPSS-4 missions comprise the Advanced Technology Microwave Sounder (ATMS), Cross-track Infrared Sounder (CrIS), Visible Infrared Imaging Radiometer Suite (VIIRS), and the Ozone Mapping Profiler Suite-Nadir (OMPS-N) instruments.

To mitigate the impact of a premature failure of JPSS-2, PFO includes a contingency option to launch JPSS-3 early with ATMS and CrIS instruments only. If the contingency is not exercised, the full JPSS-3 mission (i.e., ATMS, CrIS, VIIRS, OMPS-N) would continue as planned. Should the contingency mission be necessary, NOAA would use the VIIRS and OMPS-N instruments built for PFO/JPSS-3 for integration onto PFO/JPSS-4.

NOAA is developing PFO/JPSS-3 and PFO/JPSS-4 instruments and spacecraft buses as copies of JPSS-2. This allows PFO to take advantage of JPSS-2 instrument development to reduce cost and risk. In addition, NOAA will exercise simultaneous instrument block buys for PFO/JPSS-3 and PFO/JPSS-4 instruments on the current contracts for the most efficient acquisition strategy and production cadence. While NOAA manages JPSS and PFO as an

integrated polar satellite system, to allow for greater transparency JPSS and PFO are executed as two separate PPAs within the budget.

**See the PFO Program Change for the proposed schedule and milestones, deliverables, performance goals and measurement data, and the budget profile.**

**COOPERATIVE DATA AND RESCUE SERVICES (CDARS) [Formerly Solar Irradiance, Data and Rescue (SIDAR)]** (<http://www.sarsat.noaa.gov/>)

The CDARS program supports the space-based components of both the Argos and Search and Rescue systems. It is critical to launch these instruments no later than 2021 to ensure continuity of the services these satellites provide, articulated further below. The instruments that are currently meeting the requirements for this system are onboard satellites (e.g. MetOp-A, NOAA-15, 18 and 19) that are operating past their design lives. If NOAA is not able to deliver these instruments to space before a gap in services occurs, there will be an increase in wait times for SARSAT, which could threaten the lives of mariners and other users around the world, and possible data loss for Argos, which will jeopardize critical environmental data records.

The Argos system provides worldwide coverage that gives the satellite the unique ability to geographically locate a data source from anywhere on earth. Argos Advanced Data Collection System (A-DCS), part of Argos, collects, processes, and disseminates environmental data from fixed and mobile platforms worldwide. Each month, this system provides key environmental data from more than 21,000 active Argos platforms globally. The U.S. Government makes up the biggest user of A-DCS data, accounting for more than 40 percent of total system users. NOAA relies on the Argos system to collect worldwide ocean data (e.g., on temperatures, winds, air pressure, currents, and salinity) from moored and drifting buoys and submerged floats. In addition, Argos transmitters are deployed on a large number of marine mammals and sea turtles to track their migrations. The Argos system is administered under a joint agreement between NOAA and the French Space Agency, CNES. The Argos system operates in parallel with commercial data relay systems, with each serving different user communities. The NOAA provided A-DCS system covers transmitters not supported by commercial suppliers, who focus on the larger, more powerful transponders.

The Search and Rescue Satellite Aided Tracking (SARSAT) System is employed to detect and locate mariners, aviators, and recreational enthusiasts in distress almost anywhere in the world at any time and in almost any condition. The SARSAT system consists of two instruments: a Search and Rescue Repeater (SARR), which is a real-time transponder, and a Search and Rescue Processor (SARP). They are used for storing and downloading beacon alert signals from remote locations to support the COSPAS-SARSAT International satellite program that is coordinated by the United States, Russia, France and Canada.

Since 1982, SARSAT is credited with saving over 39,000 people worldwide, including a total of 7,749 people in the U.S. In FY 2015 alone, there were a total of 250 rescues due to SARSAT. Over 40 countries in addition to the United States currently rely on the SARSAT system for their search and rescue needs. The launch of SARSAT will support the National Search and Rescue Plan<sup>5</sup> and ensure U.S. Coast Guard, DOD, and NOAA maintain a space-based capability to detect, locate, and relay distress alerts from emergency beacons for the purpose of search and rescue (SAR) services. The SARSAT system will be replaced by a U.S. Air Force-supported GPS-based system beginning around 2023.

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<sup>5</sup> [http://www.uscg.mil/hq/cg5/cg534/manuals/Natl\\_SAR\\_Plan\(2007\).pdf](http://www.uscg.mil/hq/cg5/cg534/manuals/Natl_SAR_Plan(2007).pdf)

The life cycle cost profile below includes the NOAA costs for instrument integration onto the host spacecraft, the CDARS specific equipment required for integration, the launch vehicle, and satellite operations. The spacecraft itself will be paid for by the host selected in FY 2018. The French Space Agency (CNES) and the Department of National Defence (DND) are jointly providing the SARSAT and CNES is providing the A-DCS instruments. Both CNES and DND have already contributed approximately \$100M to the project.

**Schedule and Milestones:**

FY 2017

- Prepare Request For Proposal for Hosted Payload Solutions (HoPS) contract

FY 2018

- HoPS contract award for the A-DCS & SARSAT instruments
- Preliminary Design Review for Host Spacecraft

FY 2019

- Critical Design Review for Host Spacecraft
- Delivery of A-DCS and SARSAT instruments to the hosted payload contractor

FY 2020

- Complete integration of A-DCS and SARSAT instruments on commercial spacecraft

FY 2021

- Launch of commercial spacecraft to the desired sun synchronous orbit.
- Initiate Argos A-DCS & SARSAT operations

**Deliverables:**

- NOAA compliance with signed international agreements with France and Canada
- Operational Argos and SARSAT missions in the desired 1730 sun synchronous orbit through FY 2025
- Planned Launch Readiness date – Q1 FY 2021

Mission	Launch Readiness Date (LRD)	Launch Commitment Date (LCD)	Target Launch Date (LD)*
CDARS	Q1 FY 2021	TBD	TBD

\*The actual launch date is only known after coordination with the launch services provider.

**Performance Goals and Measurement Data:**

Performance Measure: Percent of CDARS program milestones completed on time	FY 2015 Actual	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target	FY 2021 Target
	N/A	75%	75%	75%	75%	75%	75%
<b>Description:</b> Percentage of projected milestones to be completed annually to plan and implement accommodation of the Argos-Data Collection System (A-DCS) and Search and Rescue Satellite Aided Tracking (SARSAT) instruments. This includes key decision points, major reviews, testing accommodation using HoPS.							

**Outyear Funding Estimates\* (\$ in thousands):**

CDARS	FY 2016 & Prior	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	CTC	Total
Change from FY 2017 Base	N/A	0	48,450	32,300	18,050	1,900	N/A	N/A
<b>Total Request</b>	7,800	500	48,950	32,800	18,550	2,400	9,600	120,600

\*Outyears are estimates only. Future requests will be determined through the annual budget process.

**DEEP SPACE CLIMATE OBSERVATORY (DSCOVR) (<http://www.nesdis.noaa.gov/DSCOVR/>)**

The DSCOVR satellite, which was launched on February 11, 2015, allows for the continuity of solar wind data collection. These critical data enable NOAA to provide accurate and early warnings of potentially destructive space weather events, such as geomagnetic storms, that can disrupt electrical grids, communications systems, Global Positioning System (GPS) 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 (USAF), which provided the launch services for the mission.

NOAA's Weather-Ready Nation mission requires that it have a continuous source of solar wind data, the constant stream of charged particles and magnetic fields emitted from the sun. Like terrestrial weather in the Earth's atmosphere, space weather refers to conditions like solar wind in the solar system and particularly in near-Earth space. Geomagnetic storms are caused by space weather events and are the costliest form of space weather events, with the greatest potential economic impact on the largest number of customers in every major public infrastructure system.

**See the DSCOVR Program Change for the proposed schedule and milestones, deliverables, performance goals and measurement data, and the budget profile.**

**See Technical Adjustments for proposed operational phase transfers to ensure operational phase requirements currently captured in the DSCOVR life cycle costs within the PAC account are adequately funded within the ORF offices.**

**SPACE WEATHER FOLLOW-ON**

The Administration's *National Space Weather Action Plan*<sup>6</sup> notes the growing societal demands for accurate and timely space weather information. NOAA's Space Weather Follow On program is planned to ensure continuity of space weather observations through year 2032 and adds important capabilities to the current DSCOVR satellite system to further reduce the Nation's vulnerability to space weather events.

By 2022, the detection of geomagnetic storms and other space weather events will be dependent on systems operating well past their design lives. NOAA's currently deployed DSCOVR satellite is a single string mission with a projected mission life of FY 2022. The Solar

<sup>6</sup> [https://www.whitehouse.gov/sites/default/files/microsites/ostp/final\\_nationalspaceweatheractionplan\\_20151028.pdf](https://www.whitehouse.gov/sites/default/files/microsites/ostp/final_nationalspaceweatheractionplan_20151028.pdf)

and Heliospheric Observatory (SOHO) and Solar Terrestrial Relations Observatory (STEREO) missions, launched by NASA in 1995 and 2006, respectively, are currently the only sources for Coronal Mass Ejections (CME) images. CME imagery is the model input for the 1–4 day warning of geomagnetic storm conditions, and is used operationally by NOAA as a key observation for improving the space weather forecasts. Thus, there is a high risk of a data gap for solar wind data and CME imagery. To avoid this near-term gap, NOAA plans to implement the sensors acquisition and launch Space Weather Follow On satellites on a five-year schedule.

**See the Space Weather Follow On Program Change for the proposed schedule and milestones, deliverables, performance goals and measurement data, and the budget profile.**

**CONSTELLATION OBSERVING SYSTEM for METEOROLOGY, IONOSPHERE, and CLIMATE (COSMIC-2)/Global Navigation Satellite System Radio Occultation (GNSS RO)**

COSMIC is a six-satellite constellation that was launched to the polar orbit in 2006 in a joint collaboration between Taiwan, National Science Foundation, NASA, United States Air Force (USAF), and University Corporation for Atmospheric Research (UCAR). It was a research effort to explore a new, inexpensive atmospheric sounding technique, GNSS RO, to obtain global atmospheric temperature profiles, which were not available globally from other sources. The results of the research were so positive that NOAA started using GNSS RO data operationally. GNSS RO has been proven to be a cost-effective means of increasing the volume of quality global atmospheric soundings, providing temperature, water vapor, and pressure profiles, which result in more accurate long-range weather forecasts.

The COSMIC design life was reached in April 2011 and one satellite has failed and two satellites are not fully operational, leaving only three of the original six satellites in operation. NOAA is exploring options to continue to acquire GNSS RO data for operational weather models as expeditiously as possible.

COSMIC-2 is a continuation of the partnership between the United States (NOAA and USAF) and Taiwan to produce an operational constellation of GNSS RO satellites. The USAF is providing six RO sensors to be launched in low-inclination (equatorial) orbit, known as COSMIC-2A. Taiwan will procure and operate the spacecraft for the GNSS RO satellites. NOAA will provide the ground reception system for processing data from the GNSS RO satellites. NOAA intends to leverage this ground system to acquire other RO data where possible whether from other governmental organizations or commercial operators. NOAA continues to explore launch vehicle options for the second set of sensors and/or partnerships to provide RO data commercially in a high inclination (polar) orbit.

COSMIC-2 data will be received at NOAA's Fairbanks ground station and through contracted commercial receiving stations. Data latency, or the time it takes to receive the data, is greatly improved for weather applications with each additional ground reception station. The equatorial ground reception system requires a minimum of four ground reception stations, two ground stations on each side of the globe, to achieve the threshold data latency for Numerical Weather Prediction applications. NOAA will issue competitive solicitation and continue to investigate the possibility of partnerships with other international and domestic partners to increase the number of ground reception stations to reduce data latency and increase data reliability at low cost.

A complete COSMIC-2 constellation consisting of COSMIC-2A and 6 satellites in the polar orbit is expected to provide 10 times the number of daily soundings than COSMIC currently provides, which will increase the benefits to weather forecasting. Specifically:

- GNSS RO data provides valuable information on moisture in the tropics, which is important to hurricane track and intensity forecasts. Based on data assimilation research experiments using the current COSMIC data on five 2008 West Pacific typhoons, 48-hour track errors were improved by approximately 11 percent (from 168 nm to 149 nm on average). Increases in forecast performance will affect evacuation and preparedness decisions that directly correlate to saving lives and mitigating the impact of property damage.
- Based on a study by Cucurull, L., and J.C. Derber, 2008, the documented benefits of COSMIC and other GNSS RO observations on the European MetOp satellite include a reduction in total global forecast error of approximately 9 percent.

**See the Program Changes for the proposed schedule and milestones, deliverables, performance goals and measurement data, and the budget profile.**

### **SATELLITE GROUND SERVICES (SGS)**

NOAA's satellite programs were largely developed to have stand-alone ground systems with unique designs for each mission, resulting in inefficient staffing and hardware redundancy. As its long term goal, SGS is working to transition NOAA's stand-alone ground service model into one with enterprise-wide services capable of planning and executing all common ground services for NOAA's satellite systems. SGS provides sustainment, including technology refresh and hardware/software upgrades, to the existing unique ground systems as well as those in development. SGS also actively supports the GOES-R and JPSS Program Offices with staff that participate in the completion of each new ground system.

SGS' core responsibilities include planning, acquisition, development, integration, transition to operations, and sustainment of common ground services. SGS provides engineering and project management for ground systems architecture, design, development, integration and testing, and infrastructure. SGS provides ground system sustainment for each existing legacy mission.

**See the SGS Program Change for the proposed schedule and milestones, deliverables, performance goals and measurement data, and the budget profile.**

**See Technical Adjustments for proposed operational phase transfers to ensure operational phase requirements currently captured in SGS within the PAC account are adequately funded within the ORF offices.**

### **SYSTEM ARCHITECTURE AND ADVANCED PLANNING (SAAP)**

SAAP provides NOAA with the comprehensive studies, technical recommendations, risk analysis, and independent assessments necessary to inform decisions for its systems architecture, including observational requirements, satellites, ground systems, flight operations, product generation and distribution, data archiving, and IT infrastructure. NESDIS architecture is refined and improved as needed; this means that program objectives and requirements can also change at the same time. SAAP oversees change and configuration management to ensure that the basic requirements of the architecture are being met. SAAP may eliminate, consolidate, or



restructure the architecture of current programs in order to adopt forward-looking approaches to NESDIS' space-based observational requirements.

Before each program office can take over management of a program, SAAP develops the enterprise architecture concept (i.e., a system of systems). In FY 2016, SAAP will begin the NOAA Satellite Observing System Architecture study to prioritize future user needs and instrument concepts. SAAP prioritizes products and observational requirements and ensures they meet the needs of NESDIS' customers and stakeholders. In doing so, SAAP controls requirements "creep" by identifying duplication of products and algorithms across multiple satellite programs. Finally, SAAP gains approval from the NOAA Assistant Administrator for Satellite and Information Services for each system element (i.e., each program), which will either be assigned to an existing program office or a new program office will be created.

SAAP develops and manages the technical policies and procedures that are common to all NESDIS programs and elements. SAAP updates these policies and procedures on an as-needed basis, or at a minimum of every 3-5 years. While each program office also develops its own set of policies and procedures, they must be consistent with and subordinate to the NESDIS level policies. With regard to standard risk management, SAAP manages the risks and mitigation options involving more than one NESDIS program, or those single-program risks that are either very costly or have a significant impact to users.

**See the SAAP Program Change for the proposed schedule and milestones, deliverables, performance goals and measurement data, and the budget profile.**

### **PROJECTS, PLANNING, AND ANALYSIS (PPA)**

PPA works in collaboration with domestic and foreign organizations to evaluate and develop data collection methods that advance NOAA's various missions. This includes managing the flight projects and partnerships for NOAA's altimetry (Jason), space weather (DSCOVR), radio occultation (COSMIC), legacy geostationary (GOES-N series), search and rescue (CDARS) and the legacy polar (POES) satellite missions. PPA plays a mission assurance role by integrating science planning and product development related to PPA's missions. These are the real-time products that serve NOAA's mission and fulfill international agreements.

PPA's core responsibilities include:

- Project management and integration for data exploitation opportunities, including:
  - Working with external data providers (e.g., academia, commercial sector, U.S. and foreign government agencies) to ingest the data available
  - Determining how and if NOAA can process the external data to make it useful to the National Weather Service and other users
- On-orbit anomaly support and sustainment for existing operational systems;
- Conduct studies to define observational requirements;
- Conceptual and detailed engineering for these flight project activities;
- Acquisition of partnership-based flight project systems (e.g., spacecraft, instruments, and launch services); and
- Integration, installation, and acceptance of NOAA civil operational environmental satellites systems for flight projects and partnerships.

PPA also contains the Technology, Planning, and Integration for Observations (TPIO) Office, which is responsible for validating NOAA observation analysis and requirements, conducting observing system impact and portfolio analyses, and coordinating NOAA's data management

activities. TPIO also supports the Office of Science and Technology Policy directly by conducting the triennial Earth Observing Assessment. This assessment focuses on key products, observing system inputs and impacts across the U.S. government in support of 13 Societal Benefit Areas (SBA). It is a direct input into the National Plan on Civil Earth Observation, a supplement to the President's Budget.

**See the PPA Program Change for the proposed schedule and milestones, deliverables, performance goals and measurement data, and the budget profile.**

### **COMMERCIAL WEATHER DATA PILOT**

NOAA is committed to using commercial space products where viable and appropriate, to be prepared to meet its observational requirements and promote a robust commercial space industry. As such, the Commercial Weather Data Pilot (CWDP) activity continues in FY 2017 to complete the pilot demonstration.

The CWDP is led by NESDIS in collaboration with the National Weather Service (NWS), and the Office of Oceanic and Atmospheric Research (OAR). These are the NOAA organizations responsible for the delivery, evaluation, validation and routine production of products and services derived from observational data. This same expertise will be applied to evaluate commercial data. Once a potential commercial data set(s) is selected, NOAA will establish the necessary ground infrastructure and IT security requirements, collect the data, and analyze it to assess its viability and benefit to NOAA's warnings and forecasts.

The NESDIS offices, in collaboration with NWS and OAR, responsible for the success of the Commercial Weather Data Pilot program include:

- System Architecture and Advanced Planning (SAAP): Creates/modifies the program plan, milestones, and oversees implementation.
- Projects, Planning, and Analysis (PPA): Leads the contractual efforts to request information and proposals from the commercial sector.
- Satellite Ground Services (SGS): Works with the NESDIS Assistant Chief Information Officer to establish and implement the IT security and clearance requirements.
- Satellite Applications and Research (STAR): Provides the science and algorithm requirements to use commercial data operationally or to simulate operations.
- Office of Space Commerce (OSC): Serves as the commercial vendors' entry point into NOAA.

**See the Commercial Weather Data Pilot Program Change for the proposed schedule and milestones, deliverables, performance goals and measurement data, and the budget profile.**

## **PROGRAM CHANGES FOR 2017:**

**Geostationary Operational Environmental Satellite - R (GOES-R): GOES-R: (Base Funding: \$837,891,000 and 63 FTE; Program Change: -\$85,107,000 and 0 FTE):** After an adjustment of \$33,900,000 for the FY 2017 Operational Phase Transfer, NOAA requests a decrease of \$85,107,000 and 0 FTE for a total of \$752,784,000 and 63 FTE to continue satellite engineering development, production, integration, and launch activities for the four-satellite GOES-R Series Program to deliver required operational capabilities through 2036.

The FY 2017 funding for GOES-R has been reduced to account for a technical transfer of \$33,900,000 and 0 FTE from GOES-R PAC PPA to the following PPAs within ORF: Satellite and Product Operations (\$21,690,000); NSOF Operations (\$4,800,000); Product Development Readiness and Application (\$6,000,000); and the National Centers for Environmental Information (\$1,410,000). This adjustment reflects the operational phase requirements budgeted in the GOES-R life cycle cost within the PAC account. In addition to the FY 2017 Operational Phase Transfer, the GOES-R PAC profile has been reduced by the operational transfer amount in each outyear to fund operational requirements through the GOES-R mission life.

### **Proposed Actions:**

NOAA proposes a planned reduction of \$85,107,000 to the GOES-R Program in FY 2017. The remaining funding is needed to sustain the continuity of the GOES-R program geostationary observing platforms, including sustaining the instruments, satellite, and launch vehicle activities currently under contract to meet the GOES-S launch date. The funds will also be used to continue the development activities for GOES-T and GOES-U, including GOES-T launch vehicle activities necessary to maintain the GOES-T launch commitment date of 3<sup>rd</sup> Quarter FY 2019 and ground system check out.

FY 2017 funding will support:

- GOES-R launch service activities (e.g., launch vehicle integration and testing (I&T));
- Launch of GOES-R;
- Post GOES-R launch satellite check-out and calibration activities;
- Initiation of the handover activities to NESDIS Office of Satellite and Product Operations (OSPO) for GOES-R;
- Continuation of GOES-S satellite, ground system, and flight-to-ground I&T activities;
- Continuation of launch service activities to support future launches; including launch vehicle I&T, and launch base activities;
- Continuation of GOES-T spacecraft satellite-level I&T;
- Component build and test of GOES-U; and
- Fabrication, assembly, and testing of GOES-T and GOES-U instruments and spacecraft hardware.

### **Resource Assessment:**

Current resources are described in the GOES-R Series narrative.

**Schedule and Milestones:**

FY 2017

- Launch GOES-R
- Complete GOES-S I&T

FY 2018

- Continue GOES-T I&T
- Prepare for GOES-T launch

FY 2019

- Complete GOES-T I&T

FY 2020

- Continue GOES-U I&T

FY 2021

- Complete GOES-U I&T

**Deliverables:**

Spacecraft	Launch Readiness Date (LRD)	Launch Commitment Date (LCD)	Target Launch Date (LD)*
GOES-R	Q1 FY 2017	Q1 FY 2017	Q1 FY 2017
GOES-S**	TBD	TBD	TBD
GOES-T	Q3 FY 2019	Q3 FY 2019	TBD
GOES-U*	Q1 FY 2021	Q1 FY 2025	TBD

\*The actual launch date will be identified after coordination with the launch services provider and will be determined based on the health and performance of on-orbit assets

\*\*NOAA is currently assessing a new launch schedule for the GOES-S satellite through the Key Decision Point (KDP) process.

**Performance Goals and Measurement Data:**

Performance Measure:	FY 2015 Actual	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target	FY 2021 Target
Percent of GOES-R Series Program milestones complemented on time							
<b>With Decrease</b>	N/A	N/A	75%	75%	75%	75%	75%
<b>Without Decrease</b>	95%	75%	75%	75%	75%	75%	75%
<b>Description:</b> Percent of projected milestones to be completed annually to meet the planned operational dates for GOES-R Series (GOES-R, -S, -T, and -U). This includes key decision points, major reviews, testing, and delivery for the spacecraft, instruments, as well the ground system.							

**Outyear Funding Estimates\* (\$ in thousands):**

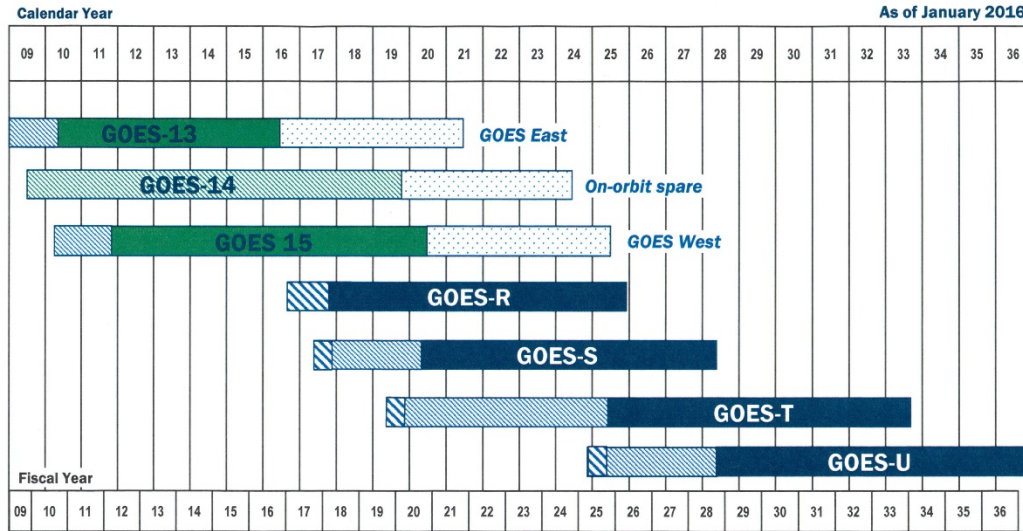
<b>GOES-R</b>	<b>FY 2016 &amp; Prior**</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC</b>	<b>Total</b>
<b>Change from FY 2017 Base</b>	N/A	(85,107)	(319,359)	(502,012)	(623,217)	(689,303)	N/A	N/A
<b>Total PAC Request</b>	6,952,951	752,784	518,532	335,879	214,674	148,588	1,226,651	10,150,059

\*Outyears are estimates only. Future requests will be determined through the annual budget process.

\*\* The FY 2016 & Prior column has been adjusted for the FY 2015 Spend Plan, including a reduction of \$5.9 million due to deobligations. Deobligation amounts are not available to the program and therefore, are not to be included as prior year costs. This action does not affect the GOES-R life cycle cost.



# NOAA Geostationary Satellite Programs Continuity of Weather Observations



Approved: *Stephen L...*  
Assistant Administrator for Satellite and Information Services



The Geostationary satellite flyout chart has been updated since the FY 2016 President's Budget submission, please note the following:

- A change in April 2015, based on engineering judgment and operational history, show estimates of lifetime based on current fuel consumption. These projections assume that instruments and critical spacecraft systems continue to perform nominally.
- Projected operational life for GOES-14 was removed because it is in on-orbit storage and has not been placed into operations.
- The GOES-R launch readiness date was adjusted from March 2016 to October 2016 to reflect the need for more time to integrate and test the vehicle before launch.
- For accuracy, there is a 6-month test & checkout period shown for GOES-S, T, and U.
- Launch schedules for the GOES-R series satellite will be evaluated based on orbit performance of GOES satellites, including GOES-S.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** NESDIS  
**Sub-program:** Systems Acquisition  
**Program Change:** GOES-R Series

<b>Object Class</b>		<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$6,921
11.3	Other than full-time permanent	0	46
11.5	Other personnel compensation	0	89
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>0</u>	<u>7,056</u>
12	Civilian personnel benefits	0	1,855
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	364
22	Transportation of things	0	1
23.1	Rental payments to GSA	0	2,226
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	313
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	(85,107)	531,575
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	107
31	Equipment	0	198,895
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	10,392
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>(85,107)</u>	<u>752,784</u>

**Jason-3: Jason-3 (Base Funding: \$4,527,000 and 3 FTE; Program Change: -\$170,000 and 0 FTE):** After an adjustment of \$2,931,000 for the FY 2017 Operational Phase Transfer, NOAA requests a planned decrease of \$170,000 and 0 FTE for a total of \$4,357,000 and 3 FTE to support the Jason-3 satellite mission.

The FY 2017 funding for Jason-3 has been reduced to account for a technical transfer of \$2,931,000 and 0 FTE from Jason-3 PAC PPA to the following PPAs within ORF: Satellite and Product Operations (\$1,777,000); Product Development Readiness & Application (\$1,104,000); and the National Centers for Environmental Information (\$50,000). This adjustment reflects the operational phase requirements budgeted in the Jason-3 life cycle cost within the PAC account. In addition to the FY 2017 Operational Phase Transfer, the Jason-3 PAC profile has been reduced by the operational phase requirements through the Jason-3 mission life.

**Proposed Actions:**

NOAA proposes to follow the established Jason-3 budget profile, reducing the program by \$170,000 in FY 2017. FY 2017 funds will support the post-launch support and sustainment of the Jason-3 satellite.

**Resource Assessment:**

The resources for this program are described in the Jason-3 narrative.

**Schedule and Milestones:**

FY 2017-2021:

- Continue support and sustainment of the Jason-3 mission

**Deliverables:**

- Continue more than 20 years of sea level observations, a critical climate monitoring variable, and provide operational ocean weather products using Jason-3 observations

Spacecraft	Launch Readiness Date (LRD)	Launch Commitment Date (LCD)	Target Launch Date (LD)	Launch Date
Jason-3	Q2 FY 2016	Q2 FY 2016	Q2 FY 2016	January 17, 2016



**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Number of ocean science products produced	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Decrease</b>	N/A	N/A	5	5	5	5	5
<b>Without Decrease</b>	N/A	N/A	5	5	5	5	5
<p><b>Description:</b> Jason-3 altimetry products will provide important data for ocean climatology studies and ocean weather forecasting. Products are Sea Level Height, El Niño/La Niña Forecast, Ocean Heat Content (to enable Hurricane Intensity Forecasts), Ocean Wave height, and Ocean Surface Current.</p> <p>Note: Jason-2 creates five data products currently. These products will be the same five that are generated by the Jason-3 mission.</p>							

**Outyear Funding Estimates (\$ in thousands)\*:**

<b>Jason-3</b>	<b>FY 2016 &amp; prior</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC</b>	<b>Total**</b>
<b>Change from FY 2017 Base</b>	N/A	(170)	3,124	811	121	121	N/A	N/A
<b>Total PAC Request</b>	155,464	4,357	7,651	5,338	4,648	4,648	4,648	186,754

\*Outyears are estimates only. Future requests will be determined through the annual budget process.

\*\*The Jason-3 PAC profile in the FY 2016 President's Budget did not support costs for the satellite beyond FY 2019. As a result of the launch delay to Q2 FY 2016, and the expected calibration/validation period, NOAA requests to extend the budget profile through FY 2022 to fund Jason-3 through its projected mission life. In addition, in order to fund requirements for an IT refresh and anomaly support provided by the NASA vendors, the PAC profile has been increased in FY 2018 and FY 2019.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** NESDIS  
**Sub-program:** Systems Acquisition  
**Program Change:** Jason-3

<b>Object Class</b>		<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$636
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>0</u>	636
12	Civilian personnel benefits	0	71
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	25
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	35
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	5
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	(170)	3,573
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	5
31	Equipment	0	7
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>(170)</u>	4,357

**Joint Polar Satellite System (JPSS): JPSS: (Base Funding: \$808,966,000 and 97 FTE; Program Change: -\$21,720,000 and 0 FTE):** NOAA requests a decrease of \$21,720,000 and 0 FTE for a total of \$787,246,000 and 97 FTE for JPSS. These funds will be used 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 JPSS.

**Proposed Actions:**

NOAA proposes to reduce the JPSS program by \$21,720,000 in FY 2017. 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 (LRD) of Q4 FY 2021.

FY 2017 funds will be used to:

- Operate and sustain the S-NPP satellite, which launched on October 28, 2011;
- Continue operations, maintenance and sustainment of the JPSS ground system for JPSS missions;
- Complete launch site integration and testing (I&T) for JPSS-1 launch;
- Launch JPSS-1 by no later than Q2 FY 2017;
- Continue the development and build of JPSS-2 spacecraft and ATMS, CrIS, VIIRS and OMPS instruments, targeting a LRD of Q4 FY2021; and
- Complete Critical Design Review for the JPSS-2 mission.

**Statement of Need and Economic Benefits:**

The observations provided by the JPSS satellites are among the highest priority measurements identified in the Administration's *National Plan for Civil Earth Observations*. Data and imagery obtained from NOAA's polar orbiting satellites ensure the timeliness, accuracy, and cost effectiveness of public warnings and forecasts of climate and weather events, reducing the loss of human life and property and protecting the national economy.

**Resource Assessment:**

The resources for this activity are described in the JPSS narrative.

**Schedule and Milestones:**

FY 2017

- Launch, commission and operate JPSS-1
- Begin calibration/validation of JPSS-1 key data products
- Continue build of JPSS-2 instruments and spacecraft
- Sustain and maintain operations of S-NPP and JPSS-1
- Design ground system refresh and upgrades to support JPSS-2 and flying missions

FY 2018

- Sustain and maintain operations of S-NPP and JPSS-1
- Continue build of JPSS-2 instruments and spacecraft
- JPSS-2 spacecraft bus integration and test
- Procure launch services for the JPSS-2 mission
- Upgrade ground system to support JPSS-2

FY 2019

- Sustain and maintain operations of S-NPP and JPSS-1
- Complete build of JPSS-2 instruments and spacecraft
- Integrate JPSS-2 instruments onto spacecraft bus
- Refresh and upgrade ground system to support JPSS-2

FY 2020

- Sustain and maintain operations of S-NPP and JPSS-1
- JPSS-2 satellite integration and test in preparation for JPSS-2 launch
- Sustain and maintain ground system to support S-NPP, JPSS-1, JPSS-2

FY 2021

- Sustain and maintain operations of S-NPP and JPSS-1
- Deliver JPSS-2 satellite to launch site
- Begin launch site integration and test in preparation for JPSS-2 launch
- Sustain and maintain ground system to support S-NPP, JPSS-1, JPSS-2

**Deliverables:**

- Launch of JPSS-1
- Maintain JPSS-2 instrument and spacecraft bus production as much as possible to protect the accelerated launch date
- Define sustainment refresh of the JPSS ground system

<b>Spacecraft</b>	<b>Launch Readiness Date (LRD)</b>	<b>Launch Commitment Date (LCD)</b>	<b>Target Launch Date (LD)*</b>
Suomi-NPP	N/A	N/A	October 28, 2011
JPSS-1	Q1 FY 2017	No later than Q2 FY 2017	Q2 FY 2017
JPSS-2	Q4 FY 2021	Q1 FY 2022	TBD

\*The actual planned launch date is only known after coordination with the launch services provider.

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Percent of JPSS Program milestones completed on time	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Decrease</b>	N/A	N/A	75%	75%	75%	75%	75%
<b>Without Decrease</b>	75%	75%	75%	75%	75%	75%	75%
<p><b>Description:</b> Percent of projected annual program oversight and technical management milestones completed each year to meet the LRD for JPSS-1 and JPSS-2. This includes key decision points, major reviews, testing, and delivery of the following instruments: VIIRS, CrIS, ATMS, CERES, and OMPS-Nadir (JPSS-1 satellite); VIIRS, CrIS, ATMS, and OMPS-Nadir* (JPSS-2 satellite).</p> <p>Note: NASA is to provide Radiation Budget Instrument (RBI) and OMPS-Limb to be accommodated on JPSS-2.</p>							

**Outyear Funding Estimates\* (\$ in thousands):**

JPSS	FY 2016 & Prior***	FY 2017	FY 2018**	FY 2019	FY 2020	FY 2021	CTC	Total
<b>Change from FY 2017 Base</b>	N/A	(21,720)	(63,189)	(236,726)	(363,884)	(432,905)	N/A	N/A
<b>Total Request</b>	7,655,445	787,246	745,777	572,240	445,082	376,061	740,274	11,322,125

\*Outyears are estimates only. Future requests will be determined through the annual budget process.

\*\*Funding reduction of \$10 million in FY 2017 is restored in FY 2018.

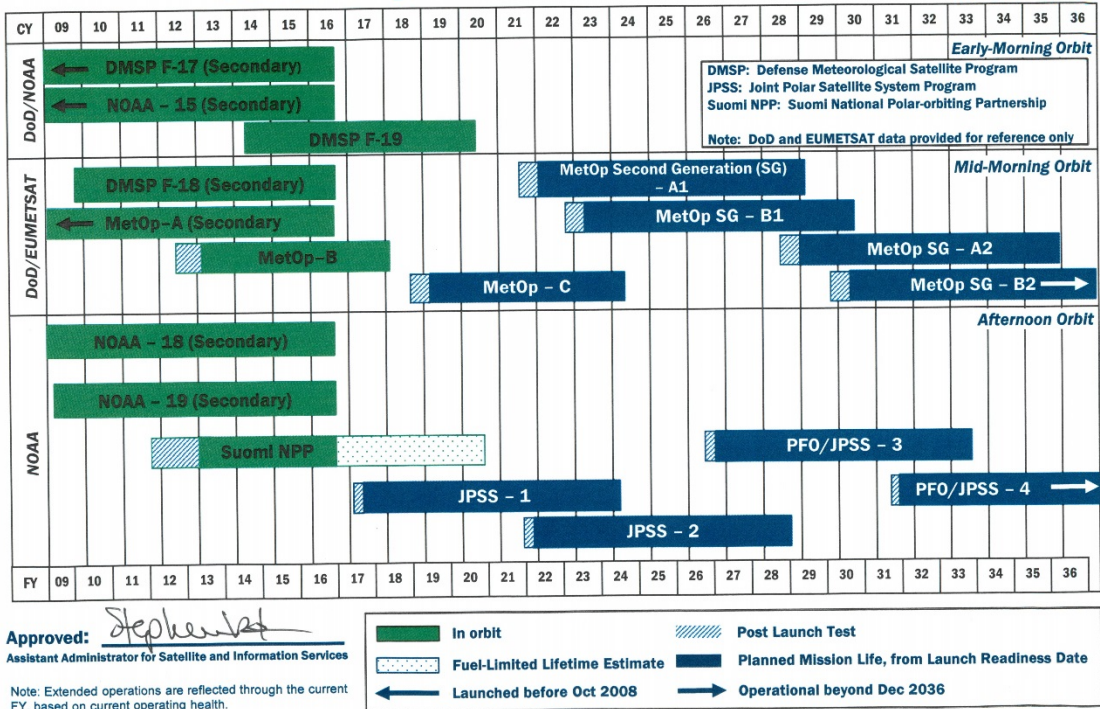
\*\*\*The FY 2016 & Prior column has been adjusted for the FY 2015 Spend Plan, which accounts for a reduction of \$5.5 million due to deobligations. Deobligation amounts are not available to the program and therefore are not to be included as prior year costs. This action does not affect the life cycle cost for the JPSS program.



# NOAA & Partner Polar Satellite Programs Continuity of Weather Observations



As of January 2016



The January 2016 Polar satellite flyout chart has been updated since the FY 2016 President's Budget submission, please note the following:

- The projected life estimates of NOAA-15, 18, and 19 have been extended through October 2016 to reflect our judgment on when these aging missions will be at the end of their useful operational lives.
- The life estimates of Suomi NPP (SNPP) has been estimated at 2020 using our engineering judgment and accounting for reliability of electronics, expected fuel depletion and wear-out mechanisms such as batteries.
- On-orbit checkout decreased for JPSS spacecraft based on favorable operational history of SNPP.
- DMSP and EUMETSAT partner spacecraft are shown for information only and have been updated based on guidance from the U.S. Air Force and EUMETSAT.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** NESDIS  
**Sub-program:** Systems Acquisition  
**Program Change:** Joint Polar Satellite System (JPSS)

<b>Object Class</b>		<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$12,507
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	64
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>0</u>	<u>12,571</u>
12	Civilian personnel benefits	0	2,679
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	313
22	Transportation of things	0	47
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	100
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	7,700
25.3	Purchases of goods & services from Gov't accounts	(21,720)	750,266
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	100
31	Equipment	0	270
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	13,200
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>(21,720)</u>	<u>787,246</u>

**Polar Follow On (PFO): PFO: (Base Funding: \$370,000,000 and 6 FTE; Program Change: +\$23,000,000 and 0 FTE):** NOAA requests an increase of \$23,000,000 and 0 FTE for a total of \$393,000,000 and 6 FTE to continue development activities in support of the PFO/JPSS-3 and PFO/JPSS-4 missions to ensure continuity of polar observations through FY 2038.

**Proposed Actions:**

NOAA is undertaking a proactive strategy to achieve polar weather constellation robustness<sup>7</sup> by FY 2023 to maintain the continuity of polar satellite observations, which are central to NOAA's weather forecast capability. This strategy minimizes life cycle cost, brings NOAA's polar constellation to a robust posture as early as possible, and ensures NOAA will continue to provide accurate and timely weather forecasts and warnings beyond JPSS-2.

As part of the robust architecture for the polar satellite system, the PFO includes mitigation activities in the event of a near term (FY 2020) or mid-term (early-2020s) loss of polar observations. Included in the PFO program activities for FY 2017 are the essential initial steps to define and develop the EON-MW risk reduction technologies and mission aimed at mitigating the impact of a potential loss of the most critical microwave sounding observations prior to JPSS-2 launch. To mitigate the impact of a premature failure of JPSS-2, PFO includes the option to launch JPSS-3 as early as Q3 FY 2023 with only the ATMS and CrIS instruments, which would still provide full JPSS sounding capability. If the contingency mission is not exercised, the full JPSS-3 mission (ATMS, CrIS, VIIRS, OMPS-N) would continue as planned.

NOAA is developing the PFO/JPSS-3 and PFO/JPSS-4 instruments and spacecraft buses as copies of JPSS-2, taking advantage of JPSS-2 development to reduce overall cost and risk to future satellites. In addition, NOAA is procuring the PFO/JPSS-3 and PFO/JPSS-4 instruments through a block buy extension of the existing JPSS-2 instrument contracts, and the spacecraft through a pre-priced option on the JPSS-2 spacecraft contract. This will achieve the most efficient acquisition strategy and production cadence.

This request funds the following activities in FY 2017:

- Continue to build the instruments for PFO/JPSS-3 and 4; including continued parts procurements, sub-assembly build up, and lower level testing and integration
- Complete detailed design for PFO/JPSS-3 and JPSS-4 missions
- Conduct multi-mission critical design review for the PFO/JPSS-3 and -4 missions
- Prepare to exercise JPSS-3 spacecraft option on the JPSS-2 spacecraft contract
- Conduct Ground Segment delta Critical Design Review (CDR) to include adaptations for PFO/JPSS-3 and JPSS-4 missions
- Initiate EON-MW design, build EDU, begin development of EON-MW flight and ground software, and initiate EON-MW risk reduction technology procurements
- Implement actions to mitigate potential gaps in JPSS observation deliverables should S-NPP or JPSS-1 experience a premature failure

**Statement of Need and Economic Benefits:**

The observations provided by the JPSS satellites are among the highest priority measurements identified in the Administration's *National Plan for Civil Earth Observations*. Observations obtained from NOAA's polar orbiting satellites ensure the timeliness, accuracy, and cost

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<sup>7</sup> A "robust" or fault tolerant architecture has two characteristics: (1) two failures (ATMS, CrIS data in the afternoon orbit) must occur to create a gap and (2) retains the ability to restore the constellation to a two-failure condition in a timely fashion.



effectiveness of public warnings and forecasts of climate and weather events, reducing the loss of human life and property and protecting the national economy.

**Resource Assessment:**

The resources for this activity are described in the Polar Follow On narrative.

**Schedule and Milestones:**

FY 2017

- Complete Program Implementation Review (PIR) for PFO
- Continue PFO/JPSS-3 and JPSS-4 parts procurement and build sub-assemblies for PFO/JPSS-3 and JPSS-4 instruments
- Initiate EON-MW design, build EON-MW EDU, begin development of EON-MW flight and ground software, and initiate EON-MW risk reduction technology procurements

FY 2018

- Continue build of PFO/JPSS-3 and JPSS-4 instruments, and exercise option for the PFO/JPSS-3 spacecraft bus
- Conduct PFO/JPSS-3 and JPSS-4 Mission Preliminary Design Review, and Key Decision Point-C to baseline both missions and to establish the mission LCC commitment
- Complete and test EON-MW EDU, develop and test flight software, begin developing ground system software and identify and select flight opportunity

FY 2019

- Continue build of PFO/JPSS-3 and JPSS-4 instruments
- Complete the build of EON-MW flight unit and ground system hardware and software, and begin integration and testing of EON-MW end-to-end system and hardware

FY 2020

- Complete PFO/JPSS-3 instrument integration and begin instrument testing
- Exercise option for the PFO/JPSS-4 spacecraft bus
- Continue build of PFO/JPSS-4 instruments
- Continue PFO/JPSS-3 bus build
- Complete EON-MW integration and testing, launch EON-MW, and begin operations

FY 2021

- Complete PFO/JPSS-3 instrument testing
- Complete PFO/JPSS-3 spacecraft build and begin instrument integration
- Continue build of PFO/JPSS-4 instruments and spacecraft
- PFO/JPSS-3 Mission Key Decision Point-D milestone review
- Continue EON-MW operations

**Deliverables:**

Spacecraft	Launch Readiness Date (LRD)
EON-MW	Q1 FY 2020
JPSS-3 Contingency Mission	Q3 FY 2023* (if necessary)
JPSS-3	Q2 FY 2024*
JPSS-4	Q3 FY 2026*

\*Launch dates (LCD and LD) will be determined based on the performance of on-orbit assets.

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Percent of Polar Follow On milestones completed on time	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	75%	75%	75%	75%	75%
<b>Without Increase</b>	N/A	TBD	TBD	TBD	TBD	TBD	TBD
<b>Description:</b> Percentage of projected annual program oversight and technical management milestones completed each year to meet the launch readiness date for JPSS-3 Contingency Mission, PFO/JPSS-3 and PFO/JPSS-4. This includes key decision points, major reviews, testing, and delivery for the antenna, ground segments and instruments for providing temperature, moisture and other meteorological data (VIIRS, CrIS, ATMS, and OMPS-Nadir).							

**Outyear Funding Estimates\* (\$ in thousands):**

<b>Polar Follow On</b>	<b>FY 2016 &amp; Prior</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC</b>	<b>Total**</b>
<b>Change from FY 2017 Base</b>	N/A	13,000	216,000	206,000	207,000	97,000	TBD	TBD
<b>PFO</b>	370,000	383,000	586,000	576,000	577,000	467,000	TBD	TBD
<b>EON-MW</b>	0	10,000	8,000	5,000	2,000	2,000	0	27,000
<b>Total Request</b>	370,000	393,000	594,000	581,000	579,000	469,000	TBD	TBD

\*Outyears are estimates only. Future requests will be determined through the annual budget process.

\*\*The PFO life cycle cost is to be provided as part of the FY 2018 budget process, and after completion of key program milestones including a parametric-based Independent Cost Estimate by DOC.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** NESDIS  
**Sub-program:** Systems Acquisition  
**Program Change:** Polar Follow On

<b>Object Class</b>		<b>FY 2016 Increase</b>	<b>FY 2016 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$1,297
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	1,297
12	Civilian personnel benefits	0	350
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	75
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	20,482	30,482
25.3	Purchases of goods & services from Gov't accounts	2,518	360,700
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	16
31	Equipment	0	80
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	23,000	393,000

**Deep Space Climate Observatory (DSCOVR): DSCOVR (Base Funding: \$2,292,000 and 4 FTE; Program Change: +\$1,453,000 and 0 FTE):** After an adjustment of \$908,000 for the FY 2017 Operational Phase Transfer, NOAA requests an increase of \$1,453,000 and 0 FTE for a total of \$3,745,000 and 4 FTE to support the DSCOVR satellite.

The FY 2017 funding for DSCOVR has been reduced to account for a technical transfer of \$908,000 and 0 FTE from the DSCOVR PAC PPA to the following PPAs within ORF: Satellite and Product Operations (\$556,000) and the National Centers for Environmental Information (\$352,000). This adjustment reflects the operational phase requirements budgeted in the DSCOVR life cycle cost within the PAC account. In addition to the FY 2017 Operational Phase Transfer, the DSCOVR PAC profile has been reduced by the operational phase requirements through the DSCOVR mission life.

**Proposed Actions:**

The DSCOVR satellite has experienced several anomalies since July 2015. Both the frequency and nature of these occurrences require additional engineering and anomaly support by the instrument and spacecraft vendors to identify and resolve the anomalies. This requirement surpasses those expected or budgeted for during program development and ensures the satellite can be returned to operations in a timely manner following anomalies.

This funding request will allow NOAA to better manage DSCOVR and ensure the satellite can continue to provide SWPC with solar wind data, the sole input for short term warnings of geomagnetic storms. FY 2017 funds will be used for the following activities:

- Tech refresh of the NASA-built ground system
- Spacecraft and instrument anomaly support to continue returning the satellite to operations when the frequent anomalies occur
- IT Security to ensure the latest IT standards are met and the safe delivery of the DSCOVR data to users

**Statement of Need and Economic Benefits:**

As NOAA has experienced more frequent anomalies than anticipated on DSCOVR, the satellite has required more time, engineering, analysis, and support than envisioned years ago when the mission was initiated. NOAA, working with the engineering team<sup>8</sup> that built the Faraday Cup, was able to bring the Faraday Cup solar wind detectors its full operational voltage of 8 kilovolt in December 2015. Yet, this instrument is still experiencing anomalies that introduce bias into some of its solar wind measurements. Furthermore, the satellite's computer system has proven to be more susceptible to single event upsets than expected. Between July 2015 and January 2016, there were eight reboots of the satellite's primary processor (CompHub), and two anomalies on the Instrument Data Processing Unit. These instances have and will continue to require additional engineering support to return the satellite to operations.

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<sup>8</sup> NASA with assistance from Massachusetts Institute of Technology and operated by the Harvard-Smithsonian Center for Astrophysics and the University of Michigan in Ann Arbor

**Resource Assessment:**

Current resources for this program are described in the DSCOVR narrative. This funding coupled with the FY 2017 request in the SPO PPA will ensure that NOAA has the required anomaly and engineering support needed to identify and recover from anomalies.

**Schedule and Milestones:**

FY 2017-2021:

- Continue support and sustainment of the mission

**Deliverables:**

- Provide timely access to operational solar wind data for geomagnetic storm warnings

Spacecraft	Launch Readiness Date (LRD)	Launch Commitment Date (LCD)	Target Launch Date (LD)	Launch Date
DSCOVR	N/A	N/A	Q2 FY 2015	February 11, 2015

**Performance Goals and Measurement Data:**

Performance Measure:	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Lead Time Geomagnetic Storm Warnings (minutes)	<b>Actual</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>With Increase</b>	N/A	N/A	40	40	40	40	40
<b>Without Increase</b>	146	40	0	0	0	0	0

**Description:** This measure is a Space Weather Prediction Center (SWPC) performance measure that represents the average lead time in minutes of warning before the arrival of a geomagnetic storm at Earth. Once SWPC receives real-time data regarding solar storm arrival at the L1 orbit, the warning is issued to customers that subscribe to their services. SWPC will also contact high impact customers such as FEMA, Coast Guard, power distributors, airlines, etc., by phone.

Without the increase, NASA's Goddard Space Flight Center would be unable to react to a spacecraft or instrument anomaly. If an anomaly renders the spacecraft or instruments useless, SWPC's warning time that depends on DSCOVR would be zero.

<b>Performance Measure:</b> Percentage of warnings issued prior to geomagnetic storm	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	100%	100%	100%	100%	100%
<b>Without Increase</b>	100%	100%	0%	0%	0%	0%	0%
<b>Description:</b> This measure is a SWPC performance measure that ensures issuance of warnings for all geomagnetic storms. Once SWPC receives real-time data regarding geomagnetic storm arrival, the alert is posted on their website and email alerts are sent to customers. SWPC will also contact high impact customers such as FEMA, Coast Guard, power distributors, airlines, etc.							
Without the increase, NASA's Goddard Space Flight Center would be unable to react to a spacecraft or instrument anomaly. If an anomaly renders the spacecraft or instruments useless, SWPC's warnings that depend on DSCOVR would not be issued prior to the storm.							

**Outyear Funding Estimates\* (\$ in thousands):**

<b>DSCOVR</b>	<b>FY 2016 &amp; Prior</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC</b>	<b>Total**</b>
<b>Change from FY 2017 Base</b>	N/A	1,453	1,568	1,546	1,546	1,546	N/A	N/A
<b>Total PAC Request</b>	100,294	3,745	3,860	3,838	3,838	3,838	3,838	123,251

\*Outyears are estimates only. Future requests will be determined through the annual budget process.

\*\*The DSCOVR PAC profile in the FY 2016 President's Budget did not support costs for the satellite beyond FY 2018. NOAA requests to extend the budget profile through FY 2022 to fund DSCOVR through its projected mission life. Additionally, in FYs 2018 - 2021 has been adjusted to account for the additional sustainment, anomaly support, and IT security associated with the frequent anomalies expected during this time.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** NESDIS  
**Sub-program:** Systems Acquisition  
**Program Change:** DSCOV

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$495
11.3	Other than full-time permanent	0	3
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	498
12	Civilian personnel benefits	0	71
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	7
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	28
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	6
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	44
25.3	Purchases of goods & services from Gov't accounts	1,453	3,083
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	3
31	Equipment	0	5
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	1,453	3,745

**Space Weather Follow On: Space Weather Follow On: (Base Funding: \$1,200,000 and 0 FTE; Program Change: +\$1,300,000 and 0 FTE):** NOAA requests an increase of \$1,300,000 and 0 FTE for a total of \$2,500,000 and 0 FTE to continue development of the Space Weather Follow On program.

**Proposed Actions:**

Based on the results of the FY 2016 Analysis of Alternatives (AoA) for critical space weather observations, FY 2017 funding will be used to select and initiate development of the selected options for solar wind data and the Coronal Mass Ejection (CME) imagery. This includes developing preliminary versions of Level 1 Requirements, Concept of Operations, and the program schedule, leading up to the program's Key Decision Point-A, when the official program, program manager, and requirements are established. After this point, the program would transition into concept and technology development.

The Space Weather Follow On program at NOAA will consist of two satellites, two launch vehicles and two sets of sensors: solar wind (PLAS/MAG/ION) instruments and compact coronagraphs (CCOR) for CME imaging to meet the Nation's demand for space weather information. NOAA is planning to avoid a near-term gap in space weather observations by implementing satellites and sensors acquisition on a five-year schedule based on planned design life. NOAA is strategically planning the Space Weather Follow On program to ensure data continuity and to build a healthy constellation through procurement efficiencies.

**Statement of Need and Economic Benefits:**

Solar wind data are the sole input for short-term warnings (15–45 minutes) of geomagnetic storms. CME imagery is the model input for the 1–4 day warning of geomagnetic storm conditions. Both inputs are used operationally by NOAA.

NOAA will be relying on the refurbished DSCOVR spacecraft, a single string mission that launched in February 2015, to provide solar wind data through FY 2022. DSCOVR will replace NASA's Advanced Composition Explorer (ACE) as the Nation's operational space weather satellite. Loss of DSCOVR without a replacement will significantly reduce NOAA's ability to warn of impending space weather storms.

The Solar and Heliospheric Observatory (SOHO) and Solar Terrestrial Relations Observatory (STEREO) missions, launched in 1995 and 2006 respectively, are the lone sources for earth-directed CME images. There is a very high risk of a data gap for CME imagery as SOHO and STEREO are significantly past their mission design lifetimes, and currently no coronagraph is planned for any NASA mission. CME imagery is currently used operationally and is a key observation for improving space weather forecasts. Without CME imagery, the 1–4 day lead-time of likely storm conditions could be degraded and could affect the accuracy of geomagnetic storm watches issued to customers.

**Resource Assessment:**

Current resources are described in the Space Weather Follow On narrative.

**Schedule and Milestones\*:**

FY 2017: Select solar wind and CME imager mission option, initiate project, and deliver preliminary major mission documents (Program Plan, Acquisition Plan, and Concept of Operations (CONOPS))



\*FY 2018- 2021 Milestones will be dependent upon the preliminary major mission documents produced in FY 2017

**Deliverables:**

- Provide timely access to operational solar wind data and CME imagery for short and long—term warnings of geomagnetic storms

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Percent of Space Weather FO Program milestones completed on time	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	75%	75%	75%	75%	75%
<b>Without Increase</b>	N/A	75%	25%	0%	0%	0%	0%
<b>Description:</b> Percent of projected annual program oversight and technical management milestones completed each year to meet the LRD for Space Weather FO. This includes key decision points, major reviews, testing, and delivery of the instruments.							

**Outyear Funding Estimates\* (\$ in thousands):**

<b>Space Weather FO</b>	<b>FY 2016 &amp; Prior</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC</b>	<b>Total**</b>
<b>Change from FY 2017 Base</b>	N/A	1,300	52,500	184,900	153,300	80,300	N/A	N/A
<b>Total Request*</b>	1,200	2,500	53,700	186,100	154,500	81,500	278,200	757,700

\*Outyears are estimates only. Future requests will be determined through the annual budget process.

\*\*The total life cycle cost estimate of \$757.7 million is based on formal Requests for Information (RFI) and initial analyses, and accounts for two planned launches; one in 2022 and the other in 2027. This estimate may change based on the final FY 2016 Analysis of Alternatives.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** NESDIS  
**Sub-program:** Systems Acquisition  
**Program Change:** Space Weather Follow On

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<hr/> 0	<hr/> 0
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	1,300	2,500
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<hr/> 1,300	<hr/> 2,500

**COSMIC-2/Global Navigation Satellite System Radio Occultation (GNSS RO): GNSS RO Ground System (Base Funding:\$10,100,000 and 1 FTE; Program Change: -\$2,000,000 and 0 FTE)**: NOAA requests a planned decrease of \$2,000,000 and 0 FTE for a total of \$8,100,000 and 1 FTE for ground reception and processing of GNSS RO satellite data.

**Proposed Actions:**

FY 2017 funding of \$8,100,000 will be utilized to complete all IT security testing and verification in preparation of the Constellation Observing System for Meteorology, Ionosphere, and Climate (COSMIC-2) launches. Also, all University Corporation for Atmospheric Research (UCAR) processing functions will be tested and certified for operations by National Centers for Environmental Prediction (NCEP). The level of funding will support the complete operational testing and validation of the Numerical Weather Prediction (NWP) models for COSMIC-2.

**Resource Assessment:**

The resources for this activity are described in the COSMIC-2/GNSS RO narrative.

**Schedule and Milestones:**

FY 2017

- Reception of equatorial low earth orbit satellite RO data from COSMIC-2A mission and completion of RO observations from first six satellites launched by USAF
- Initiate antenna refresh at Fairbanks ground station

FY 2018

- Reception of equatorial low earth orbit satellite RO data from COSMIC-2A mission
- Complete antenna refresh at Fairbanks ground station

FY 2019

- Continued processing of polar and equatorial low earth orbit satellite RO data from COSMIC-2A

FY 2020

- Reception of polar low earth orbit satellite RO data and initial validation of data flow
- Continued processing of polar & equatorial low earth orbit satellite RO data

FY 2021

- Reception of polar low earth orbit satellite RO data
- Continued processing of polar & equatorial low earth orbit satellite RO data

**Deliverables:**

- Reception and processing of RO data; improved quality control algorithms for GNSS RO data in NWS operational data assimilation systems

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Percent of ground system average data latency achieved within 45 minutes or less	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Decrease</b>	N/A	95%	95%	95%	95%	95%	95%
<b>Without Decrease</b>	N/A	95%	95%	95%	95%	95%	95%
<b>Description:</b> Data Latency is defined as: The time difference between the times of collection of the raw measurement by the spacecraft sensor and the time that the associated derived, quality-controlled product is ready for dissemination to the users from the Data Processing Center. "Average data latency" for a data product is defined as the data latency averaged over a 24 hour period.							

**Outyear Funding Estimates\* (\$ in thousands):**

<b>GNSS RO Ground System</b>	<b>FY 2016 &amp; Prior</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC**</b>	<b>Total***</b>
<b>Change from FY 2017 Base</b>	N/A	(2,000)	(2,000)	(2,000)	(2,000)	(2,000)	N/A	N/A
<b>Total Request</b>	18,897	8,100	8,100	8,100	8,100	8,100	32,400	91,797

\* Outyears are estimates only. Future requests will be determined through the annual budget process.

\*\* The budget profile for the GNSSRO Ground System has been extended by two years to support the reception and processing of RO data through FY 2025.

\*\*\*The Independent Cost Estimate (ICE) for the COSMIC-2A mission was recently completed. NESDIS is in the process of reviewing the estimate and will make any necessary updates to each Outyear Funding Estimate as part of the FY 2018 President's Budget.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** NESDIS  
**Sub-program:** Systems Acquisition  
**Program Change:** COSMIC-2/ GNSS RO Ground System

<b>Object Class</b>	<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$139
11.3 Other than full-time permanent	0	0
11.5 Other personnel compensation	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	139
12 Civilian personnel benefits	0	55
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	25
22 Transportation of things	0	0
23.1 Rental payments to GSA	0	0
23.2 Rental Payments to others	0	0
23.3 Communications, utilities and miscellaneous charges	0	0
24 Printing and reproduction	0	0
25.1 Advisory and assistance services	0	0
25.2 Other services	(2,000)	17,976
25.3 Purchases of goods & services from Gov't accounts	0	0
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	0
31 Equipment	0	5
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	0
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	(2,000)	18,200

**COSMIC-2/Global Navigation Satellite System Radio Occultation (GNSS RO): Polar Orbiting RO Data Set (Base Funding: \$0 and 0 FTE; Program Change: +\$8,100,000 and 0 FTE):** NOAA requests an increase of \$8,100,000 and 0 FTE for a total of \$8,100,000 and 0 FTE to acquire GNSS RO data from the high inclination (polar) orbit.

**Proposed Actions:**

The first launch of six satellites in FY 2016, known as COSMIC-2A, is planned for an equatorial low earth orbit (24 degree inclination) and is currently in production. The United States Air Force (USAF) is purchasing the first set of RO sensors to be flown on spacecraft procured and operated by Taiwan. NOAA will downlink all RO data from these satellites, process the data and integrate the observations into NOAA's Numerical Weather Prediction forecasts.

With this request, NOAA will continue to explore options to acquire GNSS RO data from the polar orbit. This include will include evaluating a purchase of commercially available data as well as investigating launch vehicle options and sustaining the international partnership with Taiwan to support a NOAA-built second set of sensors.

Both the GNSS RO data derived from the polar orbit and the COSMIC-2A sensors in the equatorial orbit are necessary to meet the NOAA-signed Level 1 Requirements for GNSS RO data. The primary requirements are: 45 minute average for data latency and over 8,000 soundings from the system per day. Additionally, the second set of higher inclination sensors will help to mitigate the impacts of a potential gap in polar satellite data on NWS forecasts, products and services.

**Statement of Need and Economic Benefit:**

The NWS has determined that the COSMIC mission provides high quality and timely RO data, valuable to forecasts and models because of its non-biased quality, accuracy and depth that provide important temperature and moisture data. COSMIC data has a significant impact on NOAA's numerical weather predictions and the value of the data, as measured through adjoint studies, remains in the top 5 of all atmospheric observation data collected by space- and air-borne sensors. NOAA will explore the quality and timeliness of data products from commercial options through the purchase and validation of these data products.

A robust GNSS RO constellation is critical in the event of a catastrophic loss of the JPSS-1 satellite. Together with COSMIC-2A, the assimilation of higher-inclination GNSS RO data will help to mitigate the impacts of a loss of sounder instruments from NOAA's flagship JPSS polar observing system. The GNSS RO satellites in the polar orbit will greatly improve the data set for the constellation to significantly increase the volume of high quality global atmospheric soundings, providing temperature, water vapor, and pressure profiles which will help to mitigate the impacts of a potential gap in sounder data on NWS forecasts, products and services.

**Resource Assessment:**

There are no current resources for this activity.

**Schedule and Milestones\*:**

FY 2017

- Initiate evaluation for purchase of commercially viable GNSS RO data and/or procurement of a second set of COSMIC-2 RO sensors

FY 2018

Instrument level integration and testing

FY 2019

- Deliver the second set of COSMIC-2 sensors; instrument level integration and testing review
- Satellite instrument integration and testing support

FY 2020

- Launch of 2<sup>nd</sup> set of sensors
- On-orbit performance monitoring and mission support

FY 2021

- On-orbit performance monitoring and mission support

\*Schedule and milestones for FY 2018–FY 2021 are based on procurement of a second set of six sensors.

**Deliverables:**

- GNSS RO data for assimilation into the NWS predictive weather models

**Performance Goals and Measurement Data:**

<b>Performance Measure*:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Percent of COSMIC-2 sensor milestones completed on time							
<b>With Increase</b>	N/A	N/A	75%	75%	75%	75%	75%
<b>Without Increase</b>	N/A	N/A	0%	0%	0%	0%	0%
<b>Description:</b> Percentage of annual planned milestones to meet sensor delivery. Milestones include key decision points, major reviews, and testing.							
*This performance metric is based on procurement of a second set of six sensors.							

**Outyear Funding Estimates\* (\$ in thousands):**

<b>Polar Orbiting RO Data Set</b>	<b>FY 2016 &amp; Prior</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC</b>	<b>Total**</b>
<b>Change from FY 2017 Base</b>	N/A	8,100	8,100	8,300	700	700	N/A	N/A
<b>Total Request</b>	0	8,100	8,100	8,300	700	700	2,800	28,700

\*Outyears are estimates only. Future requests will be determined through the annual budget process.

\*\*This profile represents the estimated cost for procurement of COSMIC-2B sensors and does not include the costs of launch services for the COSMIC-2B sensors to the polar orbit. A profile reflecting the purchase of commercial data rather than procuring COSMIC-2B has not yet been developed.



**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

Budget Program: NESDIS  
 Sub-program: Systems Acquisition  
 Program Change: Polar Orbiting RO Data Set

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	0
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	8,100	8,100
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	8,100	8,100

**Satellite Ground Services (SGS): SGS: (Base Funding: \$52,800,000 and 84 FTE; Program Change: +\$4,525,000 and 0 FTE):** After an adjustment of \$1,200,000 for the Operational Phase Transfer, NOAA requests an increase of \$4,525,000 and 0 FTE for a total of \$57,325,000 and 84 FTE for the planning, prototyping, and transitioning of the independent ground services into a unified set of common ground services for NOAA's environmental satellite systems.

**Proposed Actions:**

This funding request will sustain SGS program activities to plan and implement the future set of common ground services for NOAA's satellites.

Specifically, funds will support the deployment of the Enterprise Configuration Management Tool (ECMT). This tool provides an inventory of NESDIS ground system equipment and allows SGS to identify similarities across systems that can be packaged together for bulk pricing discount when upgrades are necessary. The ECMT inventory also provides trend analysis of system and equipment failures to allow more informed decision making on future upgrades.

Funds will also be used to establish a Common Ground Services Requirements tracking system to enable SGS to identify capability gaps and opportunities to improve performance across the Ground Enterprise. The applications of these improvements include stronger management controls and improved engineering consistency. This will lead to better control of the requirements baseline and improved economies of scale through increased hardware and software standardization. These activities and processes will establish a critical foundation to maintain the satellite ground infrastructure more efficiently and will enable increased adaptation and integration of new requirements into the future.

The other activities to be performed with FY 2017 funds include:

- Continue to implement capabilities to process satellite observations into useful products that meet the requirements of NOAA's operational centers and other external users;
- Sustain the current and legacy ground systems in use at NESDIS facilities, including GOES and POES capabilities;
- Continue the development of the NPOESS Data Exploitation (NDE) capability, started in 2011, that produces products from the Suomi National Polar-orbiting Partnership (SNPP) satellite;
- Establish the foundation for sustaining ground systems for upcoming satellite systems in NOAA;
- Plan the transition of the next generation of polar and geostationary satellite programs into the common ground services; and
- Prototype and transition common mission support services supporting legacy and future satellites.

**Statement of Need and Economic Benefits:**

Many of the ground systems (GS) (or ground system components) were developed and are operated specifically for each mission or mission set. The GS variations are usually driven by the latest technology at the time of the GS development rather than differences in mission requirements. As a result of the GS technology differences, the staffing for operations and maintenance of each mission is unique with little cross-staffing. SGS provides ground system sustainment, including technology refresh of hardware and software, for each existing legacy mission, and provides labor to support the GOES-R and JPSS programs in completing each new ground system.

The goal of the SGS program is to develop a common design and architectural features that are implemented across the Enterprise Ground System to allow for cost savings by reducing staff redundancies, increasing uniformity of infrastructure among sites and developing common ground services in areas such as command and control, product processing, product generation, and product distribution. These activities will consolidate functions and interfaces to reduce costs while improving cybersecurity, communications, and data archiving capabilities.

**Resource Assessment:**

Current resources are described in the SGS narrative.

**Schedule and Milestones:**

FY 2017 – FY 2021:

- Migrate legacy data distribution to centralized common distribution services
- Define a common algorithm product generation platform; and centralize, where possible, product generation services
- Sustain legacy GS (GOES, POES, Antennas)

FY 2017

- Evaluate new Production Environment using JPSS-1 data
- Upgrade components of GOES Enterprise Management System (GEMS)
- Complete refresh of the Integrated Mission Monitoring System (IMMS) and Satellite Information Management System (SIMS)
- Complete development of the CLASS Archive
- Prototype and deploy common mission support services

FY 2018

- Integrate first set of JPSS-1 products into new Production Environment
- Upgrade components of Data Collection System (DCS) Acquisition & Data Distribution System (DADDS)

FY 2019

- Begin sustainment of GOES-R Ground Segment
- Complete refresh of Initial Joint Polar System (IJPS) for MetOp-C

FY 2020

- Continue sustainment of ground segments

FY 2021

- Continue sustainment of ground segments

**Deliverables:**

- Level 1 and 2 requirements document for satellite common ground services
- Quality Management System documents
- Defined requirements and a proof of concept for Homeland Security Presidential Directive-12 solution for mission programs
- Active risk management via end-to-end ground system readiness management process
- Continued operational sustainment of the GOES ground systems
- Continued operational sustainment of the POES ground systems, including MetOp-A, -B, -C
- Long-term, safe storage that meets the NOAA Data Centers' legislative requirements

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Number of new common ground services prototyped and transitioned to operations	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	2	4	6	8	10
<b>Without Increase</b>	0	0	0	0	0	0	0
<b>Description:</b> Cumulative number of common ground services that are prototyped in the Virtual Test Lab and subsequently transitioned to operations as part of the Integrated Ground Enterprise.							

**Outyear Funding Estimates\* (\$ in thousands):**

<b>Satellite Ground Services</b>	<b>FY 2016 &amp; Prior</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC</b>	<b>Total</b>
<b>Change from FY 2017 Base</b>	N/A	4,525	4,525	4,525	4,525	4,525	N/A	N/A
<b>Total Request*</b>	104,000	57,325	57,325	57,325	57,325	57,325	N/A	Recurring

\*Outyears are estimates only. Future requests will be determined through the annual budget process.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** NESDIS  
**Sub-program:** Systems Acquisition  
**Program Change:** Satellite Ground Services

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$10,400
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	10,400
12	Civilian personnel benefits	0	2,600
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	110
22	Transportation of things	0	20
23.1	Rental payments to GSA	0	500
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	200
24	Printing and reproduction	0	1
25.1	Advisory and assistance services	0	5,380
25.2	Other services	4,525	17,864
25.3	Purchases of goods & services from Gov't accounts	0	20,000
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	50
31	Equipment	0	200
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	4,525	57,325

**Satellite Ground Services (SGS): DSCOVER Tech Refresh (Base Funding: \$0 and 0 FTE; Program Change: +\$1,700,000 and 0 FTE):** NOAA requests an increase of \$1,700,000 and 0 FTE for a total of \$1,700,000 and 0 FTE to provide a tech refresh of the DSCOVER antenna at the Wallops, Virginia Command and Data Acquisition station.

**Proposed Actions:**

The current state of the DSCOVER antenna ground system requires a technology refresh. This update will greatly lower the risk of equipment failure and ensure NOAA can continue to collect DSCOVER data from the aging antenna at the Wallops, Virginia Command and Data Acquisition (CDA) station.

FY 2017 funds will be used to provide a technology refresh of the 18 meter-A antenna located at the Wallops CDA station, which currently collects only DSCOVER data. The antenna is well beyond its expected useful life. The antenna control unit was last replaced in 2004 and replacement parts are no longer readily available for this model. If the antenna is not upgraded, NOAA would risk losing the ability to collect DSCOVER data until a suitable replacement could be procured.

**Statement of Need and Economic Benefit:**

The DSCOVER satellite allows for the continuity of solar wind data which are critical to the accuracy and lead time of NOAA's space weather warnings. NOAA will use DSCOVER data to give notice of approaching geomagnetic storms with potentially calamitous consequences for terrestrial electrical grids, communications, Global Positioning System (GPS) navigation, air travel, and satellite operations.

**Resource Assessment:**

There are currently no resources for this activity.

**Schedule and Milestones:**

FY 2017

- Continue the upgrade of the Wallops CDA antenna
- Continue sustainment of the DSCOVER antenna at Wallops CDA Station (Note: NASA sustains the main ground system)

FY 2018

- Complete the upgrade of the Wallops CDA antenna at Wallops CDA Station
- Continue sustainment of the DSCOVER antenna at Wallops CDA Station

**Deliverables:**

- Upgraded 18 meter-A antenna at Wallops CDA, VA
- Sustainment of the DSCOVER antenna ground system at Wallops CDA Station

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Lead Time Geomagnetic Storm Warnings (minutes)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	40	40	40	40	40
<b>Without Increase</b>	146	40	0	0	0	0	0
<p><b>Description:</b> This measure is a Space Weather Prediction Center (SWPC) performance measure that represents the average lead time in minutes of warning before the arrival of a geomagnetic storm at Earth. Once SWPC receives real-time data regarding solar storm arrival at the L1 orbit, the warning is issued to customers that subscribe to their services. SWPC will also contact high impact customers such as FEMA, Coast Guard, power distributors, airlines, etc., by phone.</p> <p>Without the increase, should the antenna fail and Wallops become unable to track DSCOVR, and a geomagnetic storm reaches L1 during the time Wallops should have been tracking, SWPC will be unable to provide advance warning to its customers.</p>							

<b>Performance Measure:</b> Percentage of warnings issued prior to geomagnetic storm	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	100%	100%	100%	100%	100%
<b>Without Increase</b>	100%	100%	87%	87%	87%	87%	87%
<p><b>Description:</b> This measure is a SWPC performance measure that ensures issuance of warnings for all geomagnetic storms. Once SWPC receives real-time data regarding geomagnetic storm arrival, the warning is posted on their website and email alerts are sent to customers. SWPC will also contact high impact customers such as FEMA, Coast Guard, power distributors, airlines, etc.</p> <p>The target decrease without the requested funding assumes there is no tracking capability for DSCOVR for three hours each day (the seasonally averaged estimate of time when Wallops and only Wallops is tracking DSCOVR).</p>							

**Outyear Funding Estimates\* (\$ in thousands):**

<b>DSCOVR Tech Refresh</b>	<b>FY 2016 &amp; Prior</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC</b>	<b>Total</b>
<b>Change from FY 2017 Base</b>	N/A	1,700	700	0	0	0	0	N/A
<b>Total Request</b>	0	1,700	700	0	0	0	0	2,400

\*Outyears are estimates only. Future requests will be determined through the annual budget process.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** NESDIS  
**Sub-program:** Systems Acquisition  
**Program Change:** DSCOVr Tech Refresh

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	0
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	1,700	1,700
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	1,700	1,700



**System Architecture and Advanced Planning (SAAP): SAAP: (Base Funding: \$3,929,000 and 14 FTE; Program Change: +\$1,000,000 and 0 FTE):** NOAA requests an increase of \$1,000,000 and 0 FTE for a total of \$4,929,000 and 14 FTE to complete the NOAA Satellite Observing System Architecture study and supporting grant work.

**Proposed Actions:**

The requested funding is needed to complete the NOAA Satellite Observing System Architecture (NSOSA) study. As NOAA works toward developing the next generation of environmental satellites, we are seeking to prioritize user needs, identify trade spaces across missions and other areas of opportunity to modernize NOAA's space-based observations. This study, which began in FY 2016, will provide critical recommendations to inform NOAA's future systems architecture. The end goal is to create a highly responsive architecture that can leverage a suite of capabilities, including rapid technology refresh, less costly missions and direct purchases of services and data to meet long term observational data requirements. This study is collaboration between NOAA and NASA, which will provide science and engineering expertise.

Specifically, the NSOSA study will inform NOAA's future systems architecture by:

- Developing a catalog of environmental remote sensing instrument concepts, with the capabilities and projected costs of instruments for NOAA missions beginning in FY 2028.
- Providing subject matter expertise to develop performance measures, value models, and environmental data record priorities for each type of instrument.
- Integrating and phase program costs over time, assess consistency of system alternatives with current policies, and determine the commercial missions, technology and hosting capabilities.
- Providing an estimate of the launch capabilities available to launch either NOAA assets or other assets used to service NOAA missions (e.g., commercial solutions).

In addition to the NSOSA study, the FY 2017 increase will complete funding required for a cooperative institute grant to lead the Space Platforms Requirements Working Group, which began in FY 2015. This request will allow the working group to complete the assessment of new and existing requirements against the current satellite architecture.

Together, the NSOSA study and Space Platforms Requirements Working Group will allow SAAP to define the future architecture of satellite observing systems.

**Statement of Need and Economic Benefits:**

The continuity of observations from NOAA's space borne capabilities is vital to our ability to understand and predict changes in the Earth's environment and NOAA to meet its mission to deliver timely, actionable, and reliable information to protect citizens, businesses and communities. The weather forecasting system relies on an assured and uninterrupted flow of high-quality data from our environmental satellites. This request funds the studies and analyses that will be crucial to building upon the current NESDIS infrastructure to develop the next generation of satellite observations. Working closely with the NESDIS Projects, Planning, and Analysis (PPA) office, SAAP will ensure NESDIS is engaged in advanced technology planning and execution that are consistent with the next generation systems architecture, as it defined.

**Resource Assessment:**

Current resources are described in the SAAP narrative.

**Schedule and Milestones:**

## FY 2017

- Complete the NOAA Satellite Observing System Architecture (NSOSA) study
- Support the launch and end-to-end mission validation JPSS-1 systems and products
- Complete and document the NESDIS Architecture Development Process and the findings of the Space Platforms Requirements Working Group
- Complete NESDIS Level 0 Requirements Document

## FY 2018

- Complete population of NESDIS Quality Management System (QMS) process library
- Initiate development of Level 1 Requirements documentation for Next Generation programs

## FY 2019

- Support the launch and end-to-end mission validation of GOES-T systems and products
- Maintain and evolve NESDIS QMS, informed by Next Generation pre-formulation framework

## FY 2020

- Support the launch and end-to-end-to end mission validation of COSMIC-2B and EON-MW
- Complete development of Level 1 Requirements documentation for first of Next Generation programs

## FY 2021

- Support the launch and end-to-end mission validation of JPSS-2 systems and products
- Continue completion of Level 1 Requirements documentation for Next Generation programs as their pre-formulation matures

**Deliverables:**

- NESDIS Program End-to-End Mission Validation reports and lessons learned
- NESDIS Architecture Development Process
- NESDIS Level 0 Requirements Document
- Fully populated NESDIS Quality Management System library, including configuration control of enterprise technical reference model (TRM) and engineering standards
- Level 1 Requirements Documents for Next Generation Programs in Pre-Formulation
- Active enterprise risk management

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Systems engineering policy and procedure documentation milestones completed on time	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	100%	100%	100%	100%	100%
<b>Without Increase</b>	75%	75%	75%	75%	75%	75%	75%
<b>Description:</b> The development of NESDIS policies and procedures ensures a robust framework for a rational, repeatable methodology for documentation of NESDIS' requirements management, acquisition, operations, science, architecture and data management mission areas. In FY 2017 OSAAP plans to continue the documentation of these critical policies and procedures. If NESDIS does not meet this performance goal, programmatic planning and acquisition of the next generation satellite series (approximately 2028-2031) may be delayed; placing the continuity of critical environmental observations at risk.							

**Outyear Funding Estimates\* (\$ in thousands):**

<b>SAAP</b>	<b>FY 2016 &amp; Prior</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC</b>	<b>Total</b>
<b>Change from FY 2017 Base</b>	N/A	1,000	1,000	1,000	1,000	1,000	N/A	N/A
<b>Total Request</b>	6,929	4,929	4,929	4,929	4,929	4,929	N/A	Recurring

\*Outyears are estimates only. Future requests will be determined through the annual budget process.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** NESDIS  
**Sub-program:** Systems Acquisition  
**Program Change:** System Architecture and Advanced Planning

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$724
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>0</u>	<u>724</u>
12	Civilian personnel benefits	0	159
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	24
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	131
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	1,000	3,751
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	2
31	Equipment	0	138
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>1,000</u>	<u>4,929</u>

Due to financial system limitations, the object class detail for the Total Program reflects the SAAP PPA

**Projects, Planning and Analysis (PPA): PPA: (Base Funding: \$25,200,000 and 36 FTE; Program Change: +\$8,288,000 and 0 FTE):** NOAA requests an increase of \$8,288,000 and 0 FTE for a total of \$33,488,000 and 36 FTE to support the accommodation of NOAA instruments on the European satellite MetOp-C for launch in early FY 2019.

**Proposed Actions:**

The requested increase will allow NOAA to support the suite of U.S. instruments - Advanced Very High Resolution Radiometer (AVHRR), Advanced Microwave Sounding Unit – A (AMSU A) and Space Environment Monitor (SEM) - for flight on MetOp-C. The key activities include the delivery of the Space Environment Monitor (SEM) instrument to Europe for the thermal vacuum test, the return of SEM to the U.S. for recalibration, and the redelivery of SEM to Europe for re-integration on the MetOp-C spacecraft.

**Statement of Need and Economic Benefits:**

Funding is necessary to execute the very successful polar-orbiting partnership with EUMETSAT on their MetOp satellite constellation. These three instruments, currently flying on MetOp-A and –B in the mid-morning orbit, provide polar observations similar to JPSS in the afternoon orbit. Together the MetOp and JPSS satellite constellations provide a significant amount of the critical observations that NOAA assimilates into its operational Numerical Weather Prediction models.

**Resource Assessment:**

The resources for this activity are described in the PPA narrative.

**Schedule and Milestones:**

FY 2017

- Evaluate U.S. instrument performance during MetOp-C Thermal Vacuum Test in Holland
- MetOp-C System Functional Test (SFT) in France
- Complete MetOp-C instrument Electrical Ground Support Equipment (EGSE) maintenance in Europe
- Ship MetOp-C SEM instruments to the U.S. for recalibration
- Support Radio Frequency Compatibility Testing of U.S. instruments on MetOp

FY 2018

- Calibrate MetOp-C SEM instrument in the U.S. and ship to France
- Monitor U.S. instrument performance during MetOp-C dynamics testing in France
- MetOp-C Post-mechanical testing Satellite Health Check (SHC)
- MetOp-C Satellite System Validation Test (SVT) in France
- Final MetOp-C pre-ship instrument cleaning and inspection and packing EGSE
- Support MetOp-C Flight Acceptance Review (FAR), and Pre-ship Review
- Final pre-launch cleaning and inspection at launch site in French Guiana
- Conduct NOAA component of triennial Office of Science and Technology Policy-led, USG-Wide, and Earth Observing System Assessment

FY 2019

- MetOp-C launch in Kourou and post-launch evaluation of U.S. instruments

FY 2020

- Assist NESDIS OSPO by providing engineering services to support on-orbit anomalies of U.S. instruments on MetOp and all anomalies on POES satellites

FY 2021

- Support operating missions and support planning and analyses of new missions/gap mitigation

**Deliverables:**

- Engineering support for the on-orbit POES satellites and support to EUMETSAT for U.S. instruments for MetOp satellites, either in orbit or waiting to be launched
- Management and administration of GOES and POES flight projects, MetOp, DSCOVR, Jason-3, COSMIC-2, CDARS

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Percent of milestones completed on time	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	75%	75%	75%	75%	75%
<b>Without Increase</b>	N/A	N/A	65%	65%	65%	65%	65%
<b>Description:</b> Percentage of projected annual program oversight and technical management milestones completed each year to meet the launch readiness date for MetOp-C. This includes key decision points, major reviews, testing, and delivery of the instruments.							

**Outyear Funding Estimates\* (\$ in thousands):**

<b>PPA</b>	<b>FY 2016 &amp; Prior</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC</b>	<b>Total</b>
<b>Change from FY 2017 Base</b>	N/A	8,288	8,288	8,288	8,288	8,288	N/A	N/A
<b>Total Request</b>	50,400	33,488	33,488	33,488	33,488	33,488	N/A	Recurring

\*Outyears are estimates only. Future requests will be determined through the annual budget process.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** NESDIS  
**Sub-program:** Systems Acquisition  
**Program Change:** PPA

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$4,043
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	24
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	4,067
12	Civilian personnel benefits	0	1,181
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	295
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	671
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	60
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	13,206
25.3	Purchases of goods & services from Gov't accounts	8,288	13,366
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	42
31	Equipment	0	73
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	527
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	8,288	33,488

**Commercial Weather Data Pilot: Commercial Weather Data Pilot (Base Funding: \$3,000,000 and 2 FTE; Program Change:+\$2,000,000 and 0 FTE):** NOAA requests an increase of \$2,000,000 and 0 FTE for a total of \$5,000,000 and 2 FTE to assess the potential viability of using commercial data in NOAA's weather modeling and forecasting through pilot purchases of commercial data.

**Proposed Actions:**

FY 2017 funds will continue the efforts that began in FY 2016 to evaluate, calibrate, and purchase available commercial satellite data. Dependent upon the outcome of the contractual efforts started in FY 2016, NESDIS' preliminary assessment of the actions required in FY 2017 include the following:

- Additional purchases of commercially-provided data sets;
- Prepare the necessary ground systems and IT security interfaces for ingestion of the commercial data selected;
- Develop the necessary algorithms and model and application updates to use the commercial operationally or to simulate operations within the National Weather Service Numerical Weather Prediction models;
- Testing the data to assess the accuracy, value and impact of the commercial data, to the extent possible such testing will be conducted in parallel with established, validated observations on NOAA operational products and deliverables; and
- Deliver assessment report(s) on the viability of the pilot data set(s) to meet NOAA system requirements.

**Statement of Need and Economic Benefit:**

NOAA is committed to using commercial space products in its product, warnings and forecasts, where viable and appropriate, in order to promote a robust commercial space industry and acquire observation data in a cost-effective manner. . The program will provide funds for NOAA to procure, process, and evaluate commercial data, and to determine if such data is consistent with the standards and guiding principles set forth in NOAA's Commercial Space Policy. The CWDP will provide a test case example(s) of commercial providers' ability to deliver useful data, and will identify pathways for further exploitation of new data sources.

**Resource Assessment:**

The resources for this activity are described in the Commercial Weather Data Pilot narrative.

**Schedule, Milestones and Deliverables:**

The schedule, milestones, and deliverables will be developed during FY 2016 and provided with the FY 2018 President's Budget.

**Performance Goals and Measurement Data:**

Performance measures will be developed during FY 2016 and provided with the FY 2018 President's Budget.



**Outyear Funding Estimates\* (\$ in thousands):**

<b>Commercial Weather Data Pilot</b>	<b>FY 2016 &amp; Prior</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC</b>	<b>Total</b>
<b>Change from FY 2017 Base</b>	N/A	2,000	To Be Provided with FY 2018 President's Budget*					
<b>Total Request</b>	3,000	5,000						

\*The outyear funding estimates will be determined once the program's schedule and milestones are established.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** NESDIS  
**Sub-program:** Systems Acquisition  
**Program Change:** Commercial Weather Data Pilot

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$184
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	184
12	Civilian personnel benefits	0	74
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	2,000	4,742
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	2,000	5,000

**APPROPRIATION ACCOUNT: PROCUREMENT, ACQUISITION, AND CONSTRUCTION  
SUB-PROGRAM: NESDIS CONSTRUCTION**

**SATELLITE COMMAND AND DATA ACQUISITION (CDA) FACILITY**

The Satellite CDA Facility Program repairs and renews facilities that contain critical infrastructure, which includes systems that must be available to accomplish NESDIS essential mission functions, including satellite operations and distribution of environmental data and derived products of the National Environmental Satellite, Data and Information Service. The CDA Facility Program also ensures availability of power and cooling necessary for NOAA's satellite ground systems and distribution of environmental data, and other products and services.

CDA facilities include Command and Data Acquisition (CDA) Stations at Fairbanks, AK and Wallops, VA; the NOAA Satellite Operations Facility (NSOF) at Suitland, MD; and the NESDIS Consolidated Backup (CBU) at Fairmont, WV. The facilities operate in all conditions, 24 hours per day, 365 days per year.

**Schedule and Milestones:**

FY 2017

- Replace Fairbanks CDA Station Physical Access Control and CCTV System
- Construct Fairbanks CDA Station Power Plant Rehabilitation
- Design Fairbanks CDA Station Core Security Fence
- Replace Fairmont CBU UPS Batteries and Capacitors
- Replace Suitland NSOF UPS Batteries
- Construct Wallops CDA Station Main Telecom Room Alterations
- Replace Fairbanks CDA Station Failed Medium Voltage Cables

FY 2018

- Demolish Fairbanks CDA Station Old Operations Buildings
- Construct Fairbanks CDA Station Core Security Fence
- Design Fairbanks CDA Station Satellite Operations Facility Addition
- Construct Fairbanks CDA Station Vehicle Maintenance and Storage Facility
- Replace Suitland NSOF UPS Capacitors
- Upgrade Suitland NSOF Building
- Design Wallops CDA Station Operations Building Renovation

**Deliverables:**

FY 2017

- Complete demolition of Fairbanks CDA Station Transmitter Building and Range & Rate Building. Original station buildings were constructed to support antennas no longer in service, are now abandoned and contain hazardous materials and deficiencies in structural, wall, roof, and fire protection systems.
- Complete replacement of Fairbanks CDA Station Physical Access Control and CCTV System, reducing facility vulnerability according to anti-terrorism risk assessment recommendations
- Complete construction of Fairbanks CDA Station Power Plant Rehabilitation, providing the Power Plant with independent water, sewer, heating and cooling systems; and allowing demolition of abandoned (original) main operations buildings.
- Complete construction of Wallops CDA Station Main Telecom Room Alterations, reducing risk of flooding and interruption of station telecommunications.

- Perform uninterruptible power supply (UPS) batteries and capacitors replacements. Regular replacement of UPS batteries and capacitors is necessary to preserve required energy storage and power conditioning capabilities.

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Percentage of Power and Cooling Uptime	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	99.73%	99.99%	99.99%	99.99%	N/A	N/A	N/A
<b>Description:</b> Maintain power and cooling for mission systems in order to maintain around-the-clock satellite operations, data processing, and distribution 99.99% of the time.							

**Outyear Funding Estimates\* (\$ in thousands):**

Satellite CDA	FY 2016 & Prior	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	CTC	Total
<b>Change from FY 2017 Base</b>	N/A	0	222	0	0	0	0	N/A
<b>Total Request</b>	25,960	2,228	2,450	0	0	0	0	30,638

\*Outyears are estimates only. Future requests will be determined through the annual budget process.

**PROGRAM CHANGE FOR FY 2017:**

No program change is requested for this sub-program.

## **BUDGET PROGRAM: NOAA MISSION SUPPORT**

For FY 2017, NOAA requests a total of \$286,065,000 and 923 FTE for Mission Support, including a net increase of \$3,494,000 and 34 FTE in program changes.

### **Mission Support Overview**

In FY 2017, NOAA proposes to rename its Program Support budget program to Mission Support to more appropriately align corporate and agency services to its stewardship and environmental intelligence mission. NOAA also proposes a corresponding restructure of the Programs, Projects, and Activities (PPA) within the Mission Support Operations, Research, and Facilities (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 part of the Mission Support budget program to reflect its status as an independent line office (See page MS-4).

NOAA's Mission Support services are the backbone of NOAA's programs and mission. These services provide the planning, administrative, financial, procurement, information technology, human resources, and infrastructure services that are essential to the safe and successful execution of NOAA's mission.

NOAA proposes five sub-programs/PPAs in the restructuring of the ORF account. This includes \$281,571,000 and 887 FTE in the following distribution:

- Executive Leadership (\$27,266,000 and 140 FTE) funds centralized executive management as well as policy formulation and direction.
- Mission Services and Management (\$147,357,000 and 713 FTE) funds such activities as financial reporting, budgeting, information technology, acquisition and grants, human resource services, and facilities management.
- IT Security (\$10,050,000 and 11 FTE) funds priority cyber security initiatives.
- Payment to the DOC Working Capital Fund (\$70,217,000 and 0 FTE) provides centralized services to NOAA's Line Offices and Staff Offices.
- Office of Education (\$26,681,000 and 23 FTE) provides expert support of education activities to NOAA Line, Program, and Staff Offices while promoting NOAA services and products and their benefits to the public.

Mission Support Procurement, Acquisition, and Construction (PAC) activities (\$1,000,000 and 0 FTE) include the NOAA Construction program.

### **Significant Inflationary Adjustments:**

NOAA's FY 2017 Base includes an increase of \$10,132,000 and 0 FTE to account for the full funding requirement for inflationary adjustments to current programs for Mission Support activities. This includes the estimated 2017 Federal pay raise of 1.6 percent as well as inflationary increases for non-labor activities including service contracts, utilities, field office lease payments, and rent charges from the General Services Administration (GSA).

NOAA also requests the following transfers for a net change of \$0 and 0 FTE to the agency:

Transfer Related to the David Skaggs Research Center, Boulder, CO				
From Office	PPA	To Office	PPA	Amount / FTE
MS	Mission Services and Management	OAR	Weather and Air Chemistry Labs and Cis	\$ 2,872,000 / 0 FTE
MS	Mission Services and Management	NWS	Multiple	\$ 501,000 / 0 FTE
MS	Mission Services and Management	NESDIS	National Centers for Environmental Information	\$ 519,000 / 0 FTE
MS	Mission Services and Management	NOS	Navigation, Observations and Positioning	\$ 22,000 / 0 FTE
<b>Total</b>				<b>\$ 3,914,000/ 0 FTE</b>

NOAA requests to transfer \$3,914,000 and 0 FTE to move funding for rent at the David Skaggs Research Center in Boulder, CO, from the Mission Support Facilities to the Line and Staff Offices located at the Boulder campus. An additional \$287,000 will remain in the Mission Services and Management PPA to support the Staff Offices rent funded within this line. This funding is currently appropriated within the Mission Services and Management PPA and then distributed to the Line and Staff Offices annually. This reallocation will increase efficiency and improve transparency by eliminating the need for funding transfers subsequent receipt of appropriation.

Transfer Related to the Western Regional Center, Seattle, WA				
From Office	PPA	To Office	PPA	Amount / FTE
MS	Mission Services and Management	MS	Executive Leadership	\$ 78,000 / 0 FTE
MS	Mission Services and Management	NMFS	Multiple	\$ 2,592,000 / 0 FTE
MS	Mission Services and Management	OAR	Weather and Air Chemistry Labs and Cis	\$ 1,145,000 / 0 FTE
MS	Mission Services and Management	NWS	Analyze, Forecast and Support	\$ 155,000 / 0 FTE
MS	Mission Services and Management	OMAO	Marine Operations and Maintenance	\$ 114,000 / 0 FTE
MS	Mission Services and Management	NOS	Multiple	\$ 618,000 / 0 FTE
<b>Total</b>				<b>\$ 4,702,000 / 0 FTE</b>

NOAA requests to transfer \$4,702,000 and 0 FTE to move funding associated with NOAA's Western Regional Center (WRC) facilities management activities from Mission Support Facilities

to the Line and Staff Offices. An additional \$497,000 and 0 FTE for the Western Regional Center will remain in the Mission Services and Management PPA to fund the Staff Offices portion of WRC operations. Currently, costs for these activities are paid directly through the funding appropriated within Mission Services and Management. This reallocation supports NOAA's plan to employ an integrated campus cost model whereby WRC tenants will be billed directly for the cost of services provided. An integrated cost model will provide WRC tenants with greater transparency and control of operating expenses resulting in direct incentives to reduce costs.

<b>Transfer Related to IT Security PPA</b>				
<b>From Office</b>	<b>PPA</b>	<b>To Office</b>	<b>PPA</b>	<b>Amount / FTE</b>
MS	Mission Services and Management	MS	IT Security	\$ 1,700,000 / 11 FTE
<i>Total</i>				\$ 1,700,000 / 11 FTE

NOAA requests to transfer \$1,700,000 and 11 FTE from the Mission Services and Management PPA to the IT Security PPA in order to align and consolidate IT security costs. The 11 FTE work in the OCIO Cyber Security Division and work full time on OCIO and NOAA enterprise cybersecurity efforts. This will be in line with the other restructuring efforts across Mission Support to improve transparency by streamlining offices and sub-programs under appropriate PPAs.

**Department of Commerce Shared Services Initiative:**

In efforts to support the commitment of Operational Excellence, NOAA will begin transitioning mission enabling services under the shared services model. In FY 2016, NOAA will identify both the retained human resources functions and transition a set of functions to the new delivery model. In FY 2017, NOAA will implement human resources functions and start to transition acquisitions and information technology services under the shared services delivery model. The goal of shared services is to strengthen mission delivery and improve customer service.

**PROPOSED PROGRAM SUPPORT BUDGET RESTRUCTURE**

<b>Current Sub-program</b>	<b>Current PPA</b>	<b>Proposed Sub-program</b>	<b>Proposed PPA</b>
Corporate Services	Under Secretary and Associate Offices Base	Executive Leadership	Executive Leadership
Corporate Services	NOAA Wide Corporate Services & Agency Management Base	Mission Services and Management	Mission Services and Management
Corporate Services	DOC Accounting System	Mission Services and Management	Mission Services and Management
Corporate Services	IT Security	IT Security	IT Security
Corporate Services	Payment to the DOC Working Capital Fund	Payment to the DOC Working Capital Fund	Payment to the DOC Working Capital Fund
Office of Education	Office of Education	Office of Education	Office of Education
Facilities	NOAA Facilities Management & Construction and Safety	Mission Services and Management	Mission Services and Management



**APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES  
SUB-PROGRAM: EXECUTIVE LEADERSHIP, MISSION SERVICES AND MANAGEMENT, IT  
SECURITY, DOC WORKING CAPITAL FUND**

The objectives of these Mission Support sub-programs are to

- Develop policies regarding the administration of NOAA programs with Federal agencies, the Congress, and private industry; and
- Develop and implement policy, planning, and program oversight.

**Executive Leadership**

Executive Leadership supports the leadership and management of NOAA, and represents NOAA at the executive level with other Federal agencies, Congress, NOAA stakeholders, and private industry.

**The Offices of the Under Secretary/Assistant Secretary and Deputy Under Secretary (USAO):** These offices support NOAA's leadership. Program activities consist of formulating and executing policies for achieving NOAA objectives, responding to Executive Branch policy decisions, and exercising delegated authority in committing NOAA to courses of action. USAO also includes following offices:

**Office of Legislative and Intergovernmental Affairs (OLIA):** This office serves as the primary liaison for NOAA with the members and staff of Congress. The office is responsible for the planning, direction, and coordination of legislative programs that are of immediate concern to the Office of the Under Secretary.

**Office of Communications and External Affairs:** This office is the principal point of contact for NOAA programs with the public and the news media. Its staff advises NOAA and other Departmental officials on all aspects of media relations and communication issues.

**Office of International Affairs (OIA):** This office coordinates NOAA and other leadership officials' relationship with international programs, as directed by the Office of the Under Secretary. The Director of the Office of International Affairs exercises a leadership role in establishing policies, guidelines, and procedures for NOAA's international programs.

**Office of the Federal Coordinator for Meteorology (OFCM):** This office establishes procedures for systematic and continuing review of national basic specialized meteorological and oceanographic requirements for services and supporting research. It also brings Federal agencies concerned with international activities and programs in meteorological and oceanographic programs into close consultation and coordination.

**Office of General Counsel (OGC):** OGC provides legal advice, review, and representation on a host of complex matters arising from the fulfillment of NOAA's mission. NOAA OGC ensures NOAA management decisions are made with necessary consideration of proper legal requirements, procedures, and options.

## **Mission Services and Management**

Mission Services and Management is the mission-enabling arm of NOAA that supports all operational activities and is essential to its success.

**Acquisition and Grants Office (AGO):** AGO delivers acquisition and financial assistance services, compliant with laws and regulations, on time, and at the best value to the government. NOAA's ability to accomplish its mission and provide services to the American public depends significantly on AGO's ability to obligate over \$3 billion annually through approximately 17,000 acquisition and financial assistance transactions including those of high societal impact involving major systems and/or high-risk programs. In FY 2015 for example, \$1.409 billion was obligated via 12,999 acquisition transactions, \$916 million was obligated via 4,131 financial assistance transactions, and \$974 million was transferred to other Federal agencies (primarily the National Aeronautics and Space Administration).

**Office of Chief Administrative Officer (OCAO):** OCAO is a customer driven Support Services organization responsible for building NOAA's foundation for 21<sup>st</sup> century science through four major program areas. Facilities Management oversees a portfolio of over \$5 billion in owned and leased facilities by providing capital investment planning, managing construction and modernization projects, tracking and reducing energy consumption, and ensuring common services to tenants. Asset Management administers both the real and personal property portfolios including commercial lease contracts and permits, licenses to house communications and scientific equipment, ground leases for owned property, and 177,000 personal property assets valued at over \$8.2 billion. Safety and Security Management manages the Safety and Occupational Health program and coordinates security and anti-terrorism risk protection. Administrative Services and Program Management provides advisory services and expertise to fulfill Agency compliance with records retention, financial controls, and equal employment opportunity statutes.

In FY 2015, OCAO reexamined the NOAA Safety Program and developed an Occupational Safety and Health Strategic Plan; expanded the use of shared operating responsibilities among all operating units at the NOAA Western Regional Center to create savings incentives and stimulate innovation; created the Senior Facilities Council to look across the entire facilities portfolio and develop priorities, evaluate projects, and improve planning; and completed the Southwest Fisheries Science Center project and transferred the restored original site and building back to the University of California San Diego.

**Office of the Chief Financial Officer (OCFO):** OCFO serves as NOAA's principal financial manager. NOAA has annual appropriated resources of almost \$6 billion and recorded capital asset value in excess of \$7 billion. OCFO is responsible under the CFO Act to provide the leadership necessary for NOAA to obtain an annual 'unqualified opinion' on the audit of its consolidated financial statements. The areas under the direction of the OCFO are the Budget Office, the Finance Office, Program Evaluation, Planning and Risk Management Office, the DOC Working Capital Fund (WCF), and Common Services. In FY 2015, OCFO successfully reduced carryover funding by \$101 million from FY 2014 to FY 2015. In addition, OCFO completed Strategy, Execution, and Evaluation (SEE) optimization resulting in a streamlined process and improved collaboration between planning and budgeting.

The Budget Office provides oversight, management, outreach and communication of the budget process which includes coordinating the preparation of budget submissions, and allocating and controlling the execution of all budgetary resources. The Finance Office ensures that the consolidated financial statements and reports are accurate, manages and operates the financial management system, and is responsible for the timely payment of bills. The Program Evaluation,

Planning, and Risk Management Office leads strategic planning efforts, including guidance, research, program review and evaluation in relation to the mission and available resources, risk analysis, and preparation of the agency's Strategic and Operating plans.

**The DOC Accounting System (CBS application):** The CBS application requires that the application (along with associated interfaces and feeder systems) be operated, maintained, and enhanced. Changes to the system need to be tested to ensure that integrity, availability, and confidentiality are maintained within the context of a secure application environment. The CBS user community (which consists of over 10,000 users across the agency) requires ongoing helpdesk services and training. Ongoing maintenance and support of CBS allows NOAA to maintain compliance with legal, regulatory and executive requirements such as the OMB Circular A-123 and the Federal Information Security Management Act (FISMA) and allows NOAA managers to have access to financial data necessary to make informed decisions. The Operations and Maintenance (O&M) of CBS was the primary focus for FY 2015. Enhanced security controls based on National Institute of Standards and Technology (NIST) Special Publication (SP) 800-53 "Recommended Security Controls for Federal Information Systems", and SP 800-63 "Electronic Authentication Guidelines" completed implementation during FY 2015.

**The Common Services (CS) account:** supports the NOAA CFO in providing resources for NOAA-wide activities and services provided through the DOC and other agencies through Memoranda of Understanding and/or Interagency Agreements. CS funds the Departmental Management Advances and Reimbursements (A&R) accounts providing a centralized funding source for special services and tasks provided by the DOC; off-site health services at the Census Bureau Health Unit; OPM USAJobs portal usage and maintenance; and other miscellaneous services and products.

**Office of the Chief Information Officer (OCIO):** OCIO delivers information and technology services by using an operating model focused on service delivery, customer support, innovation, and security with a mission to provide a secure and agile information enterprise with advanced computing capability that propels NOAA's scientific and operational missions. The cornerstone of the operating model is delivering shared enterprise information services through technology advancements including cloud computing, mobile devices, big data, and grid computing. In FY 2015, OCIO formed data alliances around core collaborators through the big data public private partnership, reduced backlog in the FOIA program by 56 percent, and earned a green rating on the OMB IT dashboard for NOAA IT infrastructure investment.

**Workforce Management Office (WFMO):** WFMO provides policies, programs, and processes that facilitate the development, and retention of a diverse, highly skilled, motivated, and effective workforce capable of accomplishing the Agency's mission. This office provides NOAA-wide leadership workforce management functions including strategic human capital planning, labor-management and employee relations, performance management and incentive awards, executive resources, distance learning, leadership development, training and career development, as well as human resources data management and automation initiatives. The chart in Figure 1 below shows the ratios of HR service specialists to employees serviced in NOAA and other similar scientific agencies. As noted over the past few years, NOAA's human capital management is essentially broken. By shifting labor intensive actions such as recruiting, staffing, and payroll to shared services, NOAA will be able to improve customer-focused advisory and assistance services (e.g., strategic human capital and employee/labor relations). In FY 2015, WFMO prepared transition plans and a mitigation strategy for NOAA's retained WFMO organization to position it to best engage and benefit from the DOC-led shared services model.

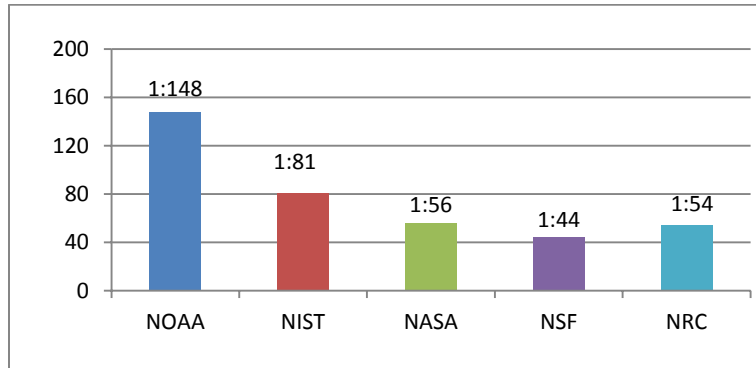


Figure 1: Ratio of HR Service Specialists to Total Employees

### **IT Security**

OCIO implements and manages NOAA's IT Security program, including the development of policy and the planning and oversight of all IT security, to ensure the integrity, confidentiality and availability of NOAA data and information. Federal cyber security priority areas include Trusted Internet Connection (TIC) capability and use, continuous monitoring of Federal information systems, and strong authentication using government issued identity credentials. In FY 2015, OCIO improved the external network traffic through TIC to 97 percent.

### **Payment to the Department of Commerce (DOC) Working Capital Fund (WCF)**

The DOC WCF provides centralized services to NOAA's Line and Staff Offices in the most efficient and economical manner. Organizational units within DOC provide the administrative, legal, information technology, financial, and policy support needed to accomplish NOAA's overall mission. The WCF was established pursuant to 5 USC 607 (15 USC 1521). Unlike other DOC bureaus, the NOAA contribution to the WCF is provided by specific allocation within the NOAA appropriation.

**Schedule and Deliverables:**

**CFO**

Description of Milestone	Planned Completion Date
Submit final Annual Performance Plan Report (APP&R) for President's Budget submission within 5 days of due date	Q2 Annually
Identify corrective action plans for Audit Findings	1-30 days after receipt of Final Findings, annually
Complete Congressional Budget Submission	Q2 Annually
Execution review and analysis	Monthly

**OCIO**

Activity	Description of Milestone	Planned Completion
Portfolio Management	Prepare OCIO Annual Operating Plan	Annually
	Prepare NOAA Strategic IT Plan	Annually
	Maintain and/or improve the overall ratings of NOAA Major Investments on the Federal IT Dashboard	Quarterly
Cyber Security	Complete Risk Management Framework (RMF) and Continuous Monitoring packages	Quarterly
	Complete Contingency Plan updates and testing in accordance with DOC policy, NIST guidance, and NOAA policy	Quarterly
	Administer annual NOAA IT security awareness training	Annually
	Complete annual FISMA Report	Annually
Enterprise Architecture	Facilitate implementation of an enterprise-wide data management architecture	Quarterly
	Update Data Center Consolidation Inventory and Implementation Plan	Annually
Shared Services	Deliver cost-effective, customer-focused IT services for the enterprise	Quarterly
Homeland Security	Plan & conduct annual NOAA HQ Continuity of Operations (COOP) exercise	Annually
	Update NOAA COOP Plan	Annually

**Performance Goals and Measurement Data:**

**AGO**

<b>Performance Measure:</b>	<b>FY</b>	<b>FY</b>	<b>FY</b>	<b>FY</b>	<b>FY</b>	<b>FY</b>	<b>FY</b>
Timeliness of acquisition actions	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
Percent of Acquisition awards made within published lead times	<b>Actual</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
	88.7%	85%	85%	85%	85%	85%	85%
<b>Description:</b> This measure tracks percentage of awards made within established Procurement Administrative Lead Times (PALT) for procurement actions.							
<b>Performance Measure:</b>	<b>FY</b>	<b>FY</b>	<b>FY</b>	<b>FY</b>	<b>FY</b>	<b>FY</b>	<b>FY</b>
Timeliness of grants actions	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>

Percent of Financial Assistance awards made within published lead times	<b>Actual</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
	96%	85%	85%	85%	85%	85%	85%
<b>Description:</b> This measure tracks percentage of awards made within timelines established for financial assistance actions.							

<b>Performance Measure:</b> Customer Satisfaction with Service (score of 4 or higher) Percent of clients rating AGO 4 or above on a scale of 1-5	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	96.9%	90%	90%	90%	90%	90%	90%
<b>Description:</b> This measure tracks customer satisfaction with AGO reflecting the percentage of survey question responses that are 4 or higher using a scale of 1 through 5.							

### CFO

<b>Performance Measure:</b> Complete End of Year Execution Reviews for NOAA Line Offices	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	100%	100%	100%	100%	100%	100%	100%
<b>Description:</b> This performance measure relates to the target levels for the Budget Office to complete the End of Year Execution Reviews for all NOAA Line Offices.							

<b>Performance Measure:</b> Expend CFO Office Funding by Year End	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	93%	92%	92%	92%	92%	92%	92%
<b>Description:</b> This performance measure relates to the target levels for the CFO Office to expend all appropriated funding by the end of Fiscal year.							

<b>Performance Measure:</b> Prompt Payment of Vendor Invoices without penalty	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	98%	98%	98%	98%	98%	98%	98%
<b>Description:</b> This performance measure relates to the target levels for the Finance Office to pay all the vendor invoices promptly and without any penalties.							

<b>Performance Measure:</b> Financial Statements and Regulatory reports due date	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	100%	100%	100%	100%	100%	100%	100%
<b>Description:</b> This performance measure relates to the target levels for the Finance Office to submit all the Financial Statements and Regulatory Reports by the due date. Previously, the							

performance targets for this measure were reported at 98 percent, which was an error. This reflects the correct targets.

### OCIO

<b>Performance Measure:</b> Percentage of systems in operation with full Authorization to Operate (ATO)	<b>FY 2015</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
	<b>Actual</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
	100%	100%	100%	100%*	100%*	100%*	100%*

**Description:** The Authorization and Accreditation (A&A) process requires a fully-tested system with a complete set of security documentation (e.g., approved security plan, risk assessment, disaster recovery plans, security testing), prior to the issuance of a full Authorization to Operate (ATO). All systems in NOAA have been inventoried for their relative ranking as National Critical, Mission Critical, or Business Essential. This IT measure reports the percentage of NOAA IT Systems that have completed the A&A process and operate under a full ATO. Systems with full ATO have completed the A&A prescribed by FISMA – security controls are in place for those systems and their FISMA documentation has been verified.

\*Target is updated annually by DOC/OCIO.

<b>Performance Measure:</b> Percentage of required Trusted Internet Connection (TIC) 2.0 capabilities that have been implemented at each TIC Access Point	<b>FY 2015</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
	<b>Actual</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
	83%	100%	100%	100%*	100%*	100%*	100%*

**Description:** The goal of TIC is to protect the data and information entering and exiting Federal networks and to identify network connections that may pose a security risk. Boundary protection is the monitoring and control of communications at the external boundary of an information system to prevent and detect malicious and other unauthorized communications, through the use of boundary protection devices (e.g., proxies, gateways, routers, firewalls, guards, encrypted tunnels). One objective of this cybersecurity cross-agency priority boundary protection initiative is to implement TIC 2.0 capabilities (i.e., a body of 60 critical capabilities that were collaboratively developed to improve upon the baseline security requirements in TIC Reference Architecture V2.0).

\*Target is updated annually by DHS.

### OCAO

<b>Performance Measure:</b> Risk is managed by keeping the value of lost or missing accountable personal property to less than 2% of the total inventory	<b>FY 2015</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
	<b>Actual</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
	99.4%	98%	98%	98%	98%	98%	98%

**Description:** This measure meets the DOC standards set forth in the DOC Personal Property Manual. An Annual Physical Inventory is completed and certified by NOAA's Property Management Officer. NOAA's baseline was set in FY 2014 at 98.9%.

<b>Performance Measure:</b> Percent of EEO Counseling complete within statutory requirements	<b>FY 2015</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
	<b>Actual</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>

	92%	100%	100%	100%	100%	100%	100%
<b>Description:</b> EEO counseling is completed in a compliant and timely manner and within statutory requirements 100% of the time.							

<b>Performance Measure:</b> Reduce the Agency administrative space Utilization Rate (U/R) on NOAA campuses	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
IRC	215 sqft	170 sqft	170 sqft	170 sqft	170 sqft	170 sqft	170 sqft
WRC	227 sqft	170 sqft	170 sqft	170 sqft	170 sqft	170 sqft	170 sqft
SSMC	194 sqft	170 sqft	170 sqft	170 sqft	170 sqft	170 sqft	170 sqft
<b>Description:</b> Campus Office Space U/R is managed towards meeting the DOC policy, DAO 217-21 Space Allowance and Management Program, of a U/R of 170 sqft.							

<b>Performance Measure:</b> Timely restoration of commercial leases	<b>FY 2015 Actuals</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	55%	75%	75%	75%	75%	75%	75%
<b>Description:</b> This measure shows the percentage of commercial leases expiring in each fiscal year that have been resolved on or before the lease expiration date.							

<b>Performance Measure:</b> Reduce total number of accidents with associated injury and/or damage costs	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	N/A	-3% (7)	-3% (7)	-3% (7)	-3% (7)	-3% (6)	TBD
<b>Description:</b> This measure focuses on reducing the total number of accidents that have injuries and/or costs (damage and worker compensation costs). The target is a 3% reduction in motor vehicle accidents; slip, trip, and fall injuries; and sprain and strain injuries each year for the next five years. FY 2015 is the base line year where there were 247 accidents; the target for FY 2016 is a reduction of 7 accidents or 3%.							



## PROGRAM CHANGES FOR FY 2017:

**Mission Services and Management: Re-Architecting Data Systems for Mission Resilience (Base Funding: \$200,000 and 1 FTE; Program Change: +\$1,400,000 and +1 FTE):** NOAA requests an increase of \$1,400,000 and 1 FTE for a total of \$1,600,000 and 2 FTE to improve data flow resiliency across NOAA's critical Information Technology (IT) systems and infrastructure. This request is part of a cross line-office initiative with NOAA's National Environmental Satellite, Data, and Information Service (NESDIS) proposal 'NESDIS IT Security' (page NESDIS-17, 38).

### **Proposed Actions:**

This cross line-office initiative will begin the process of modernizing and streamlining NOAA's IT systems. Together, these proposals will reduce labor and other costs needed to maintain many FISMA high-impact systems as well as enhance system resilience and cybersecurity. The OCIO proposal will begin the assessment for and implementation of robust enterprise architecture to reduce the severity of or potentially eliminate disruption to 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 interdependencies, and record configurations for systems that support NOAA's Primary Mission Essential Functions (PMEF). The NESDIS components dovetail with this OCIO component by migrating NESDIS' Federal Information Security Management Act (FISMA) high impact networks to NOAA OCIO enterprise services, enabling centralized authentication and automated deployment of security patches.

NOAA requests an increase of \$1.4 million in FY 2017 to make the IT systems and data flows that generate environmental intelligence more resilient in the face of threats from cyber-attack, equipment malfunctions, or natural disasters. With the requested funds, NOAA will

- identify and track mitigation of vulnerabilities affecting the flow of NOAA data;
- document system linkages and configurations to fully understand the interrelationships among the various NOAA IT systems;
- document baseline settings and metrics to enable rapid restoration of operations;
- begin to transform NOAA's fragmented IT operations into a modern and cohesive systems architecture; and
- regularly analyze and test IT systems to ensure data flow resilience under contingency and emergency operations.

The requested resources will be allocated roughly by thirds to support each of the following:

- Data collection and validation, as well as the development of information flow maps and supporting databases needed for forward-looking systems engineering.
- Development of sophisticated data analysis capabilities to conduct vulnerability assessments, incident analyses, and simulations of catastrophic situations (including the 15 Federal COOP scenarios).
- Development and implementation of enhanced data visualization and impact analysis tools to elucidate each IT link in data pathways. Once in place, the tools will present clear information for both strategic planning and clear decision-making during incidents and system failures.

**Statement of Need and Economic Benefits:**

NOAA's critical missions save lives and protect property by providing satellite imagery and data, weather forecasts and warnings, real-time oceanographic reports for maritime navigation, and other environmental information products and services. The provision of these services depends on a complex, interdependent network of information systems that span multiple line and staff offices. Interruptions to one IT system can disrupt seemingly unrelated systems and may impede or reduce the quality of warnings, information, and forecasts. Increasingly, these essential IT systems are threatened by sophisticated cyber-attacks, equipment malfunctions, and natural disasters.

To continue to meet mission goals, NOAA must reduce risk by managing the complexity of its IT operations. Some of the vulnerabilities are artifacts of NOAA's current "stovepiped" organizational structure. The development of IT systems within NOAA has occurred organically, spurred more by independent initiatives in individual line offices than by an agency-wide IT architectural vision. Moving data across the agency requires navigating through a series of ad hoc connection configurations and manually creating and maintaining firewall ports at each boundary. Consequently, no office possesses a comprehensive view of how NOAA data first collected by satellites or primary sensors gets processed through multiple IT systems to become weather forecasts, measurements of portside water levels, environmental predictions, or information on NOAA websites and public distribution channels. NOAA needs additional resources to better secure its data, bolster information systems resilience, and ensure that the timely and quality products and services valued by the American people continue to flow even if a key IT system fails.

During the early autumn of 2014, an internet-sourced attack compromised several NOAA websites. When NOAA took the affected web servers and networks offline to contain the attack, unforeseen impacts to data transmission stopped the flow of critical satellite information to the National Weather Service. Although no weather forecasts or warnings were disrupted, the absence of a clear picture of the complex interrelationships and data interdependencies among NOAA IT systems – many of which are located in different line offices – was a key factor in the severity of the outage. This initiative will directly address and mitigate this identified risk.

**Resource Assessment:**

The NOAA Homeland Security Program Office currently funds a single FTE for the end-to-end analysis of operations supporting NOAA PMEFs. OCIO needs additional resources to expedite implementation of the enterprise architecture system to reduce systems risk and protect public access to NOAA's environmental intelligence.

Implementing centralized enterprise authentication and deployment of security patches for FISMA high-impact systems, such as the NESDIS systems, has been difficult with current resources because these systems are purposely segregated from other NOAA systems in order to maintain heightened security. Nevertheless, automation of security updates is expected to reduce costs by as much as 30 percent relative to current deployment methods and lead to better public preparedness in the face of disasters as well as and enhanced economic opportunity.

**Schedule and Milestones:**

- Develop procedures and requirements for databases and data tools, Q4 FY 2016
- Complete acquisition and development of databases and data tools, Q4 FY 2017
- Commence virtual data flow resiliency testing of IT system architecture, Q2 FY 2018
- Provide complete NOAA-wide IT system architecture PMEF data flow mapping, Q4 FY 2019

**Deliverables:**

- NOAA-wide IT system architecture
- System engineering capability
- Enhanced data flow resilience
- Reduced risk to those dependent on NOAA environmental intelligence products

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Percentage of NOAA PMEF Mission Threads operating under normal conditions <sup>1</sup> mapped and validated on annual basis (percentage of total mission threads)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	30%	50%	80%	100%	100%
<b>Without Increase</b> (different data flows mapped each year)	7%	7%	7%	7%	7%	7%	7%
<p><b>Description:</b> This NOAA-wide cybersecurity and re-architecting effort will map each of the steps taken (e.g., observations → modeling → predictions → dissemination) as NOAA transforms the data it acquires into the products and information used by stakeholders to protect lives and property, safeguard marine resources, and promote commerce. These steps, when described end to end, are known as “mission threads” or “value chains.” Each NOAA Primary Mission Essential Function (PMEF) is made up of multiple mission threads. Mapping and validating these mission threads (highlighting the linkages, shared vulnerabilities, and interdependencies between NOAA’s IT systems) will support NOAA’s mission, products, and services to the American people by catalyzing a more modernized, streamlined, and secure enterprise IT system. Accordingly, this metric reflects the percentage of the actual number of fully diagrammed mission threads relative to the total number of PMEF mission threads. (Note: Each PMEF and therefore each thread must be remodeled annually in order to capture system and architecture changes.)</p>							

<sup>1</sup> Details of threads will be different under continuity of operations conditions or IT systems contingency plans.

<b>Performance measure:</b> Number of Federal COOP disaster scenarios modeled for each mission thread (total n=15) (cumulative)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	2	4	6	15	15
<b>Without Increase</b>	1	2	2	2	2	2	2
<b>Description:</b> Federal planners recognize 15 distinct scenarios for contingency planning. These 15 Continuity of Operations (COOP) scenarios (which include natural and man-made disasters such as tornados, cyber-attacks, and acts of terrorism) will serve as OCIO's foundation to identify and model threats to critical IT infrastructure. OCIO will model and identify potential vulnerabilities for each of these scenarios and apply it to mapped mission threads to simulate potential catastrophic impacts and inform improvements to IT architecture. Using existing resources, OCIO expects to complete work on the first two of the 15 models in FY 2016. With the additional funding from this initiative, at least two more scenarios will be modeled in FY 2017, with the remainder of the 15 to follow in out years. (Note: These models require consistent updating to maintain accuracy.)							

<b>Performance Measure:</b> Percentage of mission threads and COOP scenario models supported by enhanced data visualization and analysis tools	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	15%	40%	60%	100%	100%
<b>Without Increase</b> (different data flow and same COOP scenarios modeled each year)	7%	10%	10%	10%	10%	10%	10%
<b>Description:</b> This investment lowers, risk, increases resilience, and better assures mission achievement. NOAA will develop and implement enhanced data visualization and impact analysis tools to support decision-making without the need for extensive manual inputs. These tools will summarize potential critical IT infrastructure impacts by integrating threat information and mission thread data. These analyses support clear decision-making during both incident response and facilitate longer-term strategic planning including "what if" modeling for optimization of investment decisions (e.g. how to invest to best mitigate systemic risk). After the initial development, more threads will be visualized and analyzed with the enhanced tools. By 2020, NOAA will have mapped all mission threads with each of the 15 COOP scenarios, implemented mechanisms and controls to streamline mission thread database maintenance, and completed integrating decision-support tools to produce automated analyses (although some manual maintenance and oversight still will be required).							

**PROGRAM CHANGE PERSONNEL DETAIL**

**Budget Program:** Mission Support  
**Sub-program:** Mission Services and Management  
**Program Change:** Re-Architecting Data Systems for Mission Resilience

<b>Title:</b>	<b>Location</b>	<b>Grade</b>	<b>Number of Positions</b>	<b>Annual Salary</b>	<b>Total Salaries</b>
IT Specialist	Silver Spring, MD	ZA-IV	1	92,004	92,004
<b>Subtotal</b>			<u>1</u>		<u>92,004</u>
less Lapse		25%	<u>0</u>		<u>(23,001)</u>
Total full-time permanent (FTE)			1		69,003
2017 Pay Adjustment		1.6%			<u>1,104</u>
<b>TOTAL</b>					<u>70,107</u>

**Personnel Data**

Full-Time Equivalent Employment

- Full-time permanent
- Other than full-time permanent
- Total

Number
1
<u>0</u>
1

Authorized Positions:

- Full-time permanent
- Other than full-time permanent
- Total

1
<u>0</u>
1

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Mission Support  
**Sub-program:** Mission Services and Management  
**Program Change:** Re-Architecting Data Systems for Mission Resilience

<b>Object Class</b>	<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11 Personnel compensation		
11.1 Full-time permanent	70	73,325
11.3 Other than full-time permanent	0	617
11.5 Other personnel compensation	0	0
11.8 Special personnel services payments	0	390
11.9 Total personnel compensation	70	74,332
12 Civilian personnel benefits	20	20,899
13 Benefits for former personnel	0	257
21 Travel and transportation of persons	0	604
22 Transportation of things	0	257
23.1 Rental payments to GSA	0	8,598
23.2 Rental Payments to others	0	845
23.3 Communications, utilities and miscellaneous charges	0	4,168
24 Printing and reproduction	0	25
25.1 Advisory and assistance services	0	4,020
25.2 Other services	810	31,934
25.3 Purchases of goods & services from Gov't accounts	0	140
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	500	539
31 Equipment	0	437
32 Lands and structures	0	1,630
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	72
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	1,400	148,757

**Mission Services and Management: Building Capacity to Provide NOAA-Wide Mission Support: (Base Funding: \$147,357,000 and 713 FTE; Program Change: +\$4,375,000 and + 33 FTE)**: NOAA requests an increase of \$4,375,000 and 33 FTE for a total of \$151,732,000 and 746 FTE to improve, oversight, guidance, and administrative operations and services that support NOAA's core mission areas.

**Proposed Actions:**

Additional funding is necessary to transform from NOAA's current service delivery model to a joint NOAA and DOC shared services model and to support NOAA's retained mission support functions. This request of \$4.4 million prioritizes NOAA's efforts to strengthen human capital and acquisition management.

*Improve Mission Services*

Properly funding NOAA's mission support functions is essential for NOAA to retain its ability to provide services and data that the public requires every day to make sound decisions on public safety and economic welfare. Inadequate staffing inhibits professional development, hinders acquisition and financial assistance services, Existing inadequacies directly jeopardize NOAA's ability to fulfill its broad mission and provide services to the American people. By shifting labor intensive actions such as recruiting, staffing, and payroll to shared services, NOAA will be able to improve customer-focused advisory and assistance services (e.g., strategic human capital and employee/labor relations). In FY 2017, NOAA will implement shared service human capital functions, and start to transition acquisitions to the shared services delivery model.

NOAA will hire up to 44 entry and mid-level employees (33 in FY 2017 and 11 in FY 2018). Staff will be in human resources and acquisition functional areas where NOAA continues to struggle to provide adequate support and achieve compliance.

Human Resources (HR):

As NOAA transitions to service deliver model, transactions based services such as hiring, onboarding, compensation management and separations will move to Shared Services, however customer focused advisory and assistance services will remain in the retained organization NOAA requires additional staff to improve these retained services which include human resources strategy, organizational management/position control and management, recruitment, performance management, human resources development, employee relations, and labor relations.

Additionally, these positions will allow Workforce Management Office (WFMO) to:

- Enhance consistency and continuity in client services through advanced workforce planning, advisory support, policy development, and program management,
- Improve recruiting timeframes (based on the 80-day hiring standard), and
- Reduce the number of unfilled vacancies in mission-critical positions.

Acquisition and Grants:

NOAA requires additional staff to improve contract administration on large, highly visible projects and programs including environmental satellites to ensure timely, high quality delivery of vendor goods and services to NOAA clients and to reduce costs. Examples of programs and areas that could benefit from additional capacity at AGO include the following:

- Timely processing of grants in programs such as those for the Pacific Coastal Salmon Recovery Fund, Regional Fishery Management Councils, Cooperative Institutes and the University Corporation for Atmospheric Research (UCAR).
- Timely award and management of contracts supporting the GOES, JPSS, and Jason Satellite systems, Satellite Ground Support, Environmental Data Management and Radio Frequency Interference Monitoring.
- Execution and management of several large NWS contracts including the Advanced Weather Interactive Processing System (AWIPS), WCOSS High Performance Computing Program, Integrated Dissemination Program, NEXRAD Service Life Extension Program and the Ground Readiness Project. Increasing timeliness in payments to vendors (e.g., small businesses for charting), property and equipment maintenance (e.g., small boats or electronic reporting equipment), and avoided audit findings.
- Improving effectiveness in the delivery of acquisition and financial assistance services to NOAA clients primarily through improved contract strategies, robust requirements definition and validation, and strong, independent government cost estimates.

**Statement of Need and Economic Benefits:**

NOAA programs that provide information and services to the American people cannot function without mission services supporting them with contracts, personnel, financial management, administrative systems, policy interpretation, among other things. This request directly supports an expanded and better qualified workforce that supports mission-critical efforts at line offices.

NOAA's programs already suffer from significantly degraded support services; delayed and degraded acquisition, grants, and contract management services. Underfunded mission services also hinders NOAA's ability to fulfill regulatory mandates, address areas at risk of non-compliance, and provide information and services that save lives and support commerce. The following were provided by the staff offices as examples of missions with high societal impacts involving major systems and/or high risk that *currently* are negatively affected by insufficient mission services funding:

- Weather warnings and forecasts for public safety and preparedness (Ground Readiness Project, hurricane prediction)
- Facilitating \$1.7 trillion in marine commerce (collect hydrographic data for safe and efficient ocean transport)
- Global Earth observations for severe weather prediction and environmental monitoring (JPSS)
- Environmental data long-term management and accessibility (Comprehensive Large Array-data Stewardship System (CLASS))
- Production, technological advancement, and delivery of climate data for stakeholders (Regional Climate Centers)
- Supporting homeland security and emergency response (National Geodetic Survey/remote sensing and other advanced data collection)
- Meeting statutory mandates as established by Congress (collection of hydrographic data, consultations under the Endangered Species Act, supporting resilient coastal and ocean ecosystems and communities, etc.)
- Promoting economic activity related to more than one-third of America's gross domestic product (providing daily weather forecasts, severe storm warnings, climate monitoring, fisheries management, coastal restoration, and supporting marine commerce)



## Acquisition and Grants:

NOAA's ability to accomplish its mission and provide services to the American public depends significantly on AGO's ability to obligate over \$3 billion annually through approximately 17,000 acquisition and financial assistance transactions including those of high societal impact involving major systems and/or high-risk programs. In FY 2015 for example, \$1.409 billion was obligated via 12,999 acquisition transactions, \$916 million was obligated via 4,131 financial assistance transactions, and \$974 million was transferred to other Federal agencies (primarily the National Aeronautics and Space Administration). AGO currently does not have the resources required to efficiently and effectively execute its day-to-day responsibilities and support NOAA in providing critical services to the nation. Additional resources will allow NOAA to build upon current efforts by:

- Expanding NOAA's strategic sourcing initiatives through the addition of federal and contract positions to support robust spend analysis, technical order consolidation, better client solutions through proactive client engagement, and development of high quality Task Order specifications. The results will be greater effectiveness and efficiency through a focus on requirements definition and validation, independent government cost estimating, dollar savings through volume discounting, and industry investment in NOAA domains.
- Improving proactive client services by providing robust requirements definition and validation during the acquisition planning stage, strong independent government cost estimates backed by thorough cost validation, enhanced training to support NOAA's Corporate Workforce and expert consulting services that support highly complex and technically challenging projects.
- Providing improved contract management on large, highly visible projects and programs and improved tools and methods to support acquisition and financial assistance professionals.

## Human Resources:

Without funding for additional FTE in the WFMO, NOAA will be unable to successfully transition to the shared services model. NOAA will not be able to deliver quality human resource services focused on workforce planning, advisory and assistance services. There is a lack of consistency and continuity of service, delayed recruitment (including not meeting the 80-day hiring standard<sup>2</sup>), and increased risk to effective program management and planning.

### **Resources Assessment:**

The specific activities currently being conducted with this program's resources are described in the narrative for Mission Services and Management which will enable NOAA to take steps toward a more sustainable workforce and increase focus on areas at greatest risk of non-compliance. This investment will allow Mission Services to effectively and efficiently perform in a rapidly changing and technologically integrated business environment. Additional Federal and contract staff will help NOAA meet basic fiduciary duties while protecting the public interest, promoting organizational excellence, providing better internal controls, and supporting legal and regulatory compliance. Without the requested funding, NOAA will continue to implement decentralized solutions to meet NOAA's basic functions, resulting in increased costs to NOAA's programs.

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<sup>2</sup> President Obama's administration implemented a comprehensive Hiring Reform Initiative, which called for upgrading the quality and speed of hiring within the Federal Government. As part of this initiative, the Office of Personnel Management (OPM) suggested that agencies use an 80-day standard model for non-SES/SL/ST positions for end-to-end hiring. The Department of Commerce has adopted the 80-day hiring model, however success is predicated on strong annual staffing plans, accurate recruitment documents, and up-front approvals in place.

**Schedule and Milestones:**

- Recruit and hire 44 FTE by the fourth quarter of FY 2018
- Full implementation of the Human Resources shared services model.
- Start transition to the Acquisitions shared services model.

**Deliverables:**

- Reductions in cost overruns, duplication of contracts, claims, requests for equitable adjustments, protests, and late deliveries
- Improvements in Workforce Information systems and Strategic Human Capital Planning

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Improve HR Assistant and HR Specialist Service Ratio	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	1:105	1:106	1:106	1:107	1:108
<b>Without Increase</b>	1:117	1:111	1:111	1:112	1:113	1:114	1:115
<b>Description:</b> This ratio shows how many NOAA employees are serviced by one HR Specialist, or Assistant. (This performance measures assumes a continued trend of a growing NOAA workforce.)							

<b>Performance Measure:</b> 80-Day Hiring Model	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	130	125	120	115	110
<b>Without Increase</b>	150	145	140	140	140	140	140
<b>Description:</b> This measure reflects the average number of days it takes to bring employees on board (from the validated request for the recruitment action to the new employee’s entry-on-duty date). The targets are averages based on current performance relative to NOAA’s 80-day hiring model (which includes all steps). Improved performance levels “With Increase” assume improvements in advanced planning of hiring activity. (NOAA 80-day hiring model can be accessed at <a href="http://www.wfm.noaa.gov/pdfs/80_CalDayHiringProcess.pdf">www.wfm.noaa.gov/pdfs/80_CalDayHiringProcess.pdf</a> .) The targets differ from DOC 80-day hiring model, which omits the entry-on-duty steps (11-14).							

<b>Performance Measure:</b> Customer Satisfaction with AGO Service	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b> (score 4 & above)	N/A	N/A	92%	93%	93%	93%	93%
<b>Without Increase</b> (score 4 & above)	96%	90%	90%	90%	90%	90%	90%
<b>Description:</b> This measure is the average customer rating on customer satisfaction surveys. These surveys track the satisfaction of AGO customers based on a 1-5 scale (5 representing the highest satisfaction level).							

<b>Performance Measure:</b> Timeliness of acquisition actions Percent of Acquisition awards made within published lead times	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	87%	88%	89%	90%	90%
<b>Without Increase</b>	88.7%	85%	85%	85%	85%	85%	85%
<b>Description:</b> This measure tracks percentage of awards made within established Procurement Administrative Lead Times (PALT) for procurement actions.							

## PROGRAM CHANGE PERSONNEL DETAIL

**Budget Program:** Mission Support  
**Sub-program:** Mission Services and Management  
**Program Change:** Building Capacity to Provide NOAA-Wide Mission Support

Title:	Location	Grade	Number of Positions	Annual Salary	Total Salaries
HR Specialist	Silver Spring, MD	ZA-III	10	63,091	630,910
HR Specialist	Silver Spring, MD	ZA-IV	12	89,924	1,079,088
Contract Specialist	Silver Spring, MD	GS-9	10	52,668	526,680
Contract Specialist	Silver Spring, MD	GS-12	12	76,378	916,536
<b>Subtotal</b>			<u>44</u>		<u>3,153,214</u>
2016 Pay Adjustment	1.30%				40,992
Subtotal					3,194,206
less Lapse	25%		<u>(11)</u>		<u>(798,551)</u>
Total full-time permanent (FTE)			33		2,395,654
2017 Pay Adjustment	1.6%				38,330
TOTAL					<u>2,433,985</u>

### Personnel Data

	Number
Full-Time Equivalent Employment	
Full-time permanent	33
Other than full-time permanent	<u>0</u>
Total	33
Authorized Positions:	
Full-time permanent	44
Other than full-time permanent	<u>0</u>
Total	44

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** Mission Support  
**Sub-program:** Mission Services and Management  
**Program Change:** Building Capacity to Provide NOAA-Wide Mission Support

<b>Object Class</b>	<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11 Personnel compensation		
11.1 Full-time permanent	2,434	75,752
11.3 Other than full-time permanent	0	617
11.5 Other personnel compensation	0	0
11.8 Special personnel services payments	0	390
11.9 Total personnel compensation	2,434	76,759
12 Civilian personnel benefits	800	21,699
13 Benefits for former personnel	0	257
21 Travel and transportation of persons	80	684
22 Transportation of things	10	267
23.1 Rental payments to GSA	660	9,258
23.2 Rental Payments to others	0	845
23.3 Communications, utilities and miscellaneous charges	170	4,338
24 Printing and reproduction	33	58
25.1 Advisory and assistance services	0	4,020
25.2 Other services	0	30,534
25.3 Purchases of goods & services from Govt accounts	0	140
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	85	624
31 Equipment	103	547
32 Lands and structures	0	1,630
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	72
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	4,375	151,732

**Mission Services and Management: Accelerate NOAA Facility Disposal (Base Funding: \$5,686,000 and 154 FTE; Program Change: +\$2,067,000 and 0 FTE):** NOAA requests an increase of \$2,067,000 and 0 FTE for a total of \$7,753,000 and 154 FTE to dispose of unneeded facilities and structures in order to reduce the NOAA footprint and right size the facility portfolio.

**Proposed Actions:**

NOAA operates and manages a large and geographically dispersed facility portfolio with scarce resources, focusing mainly on emergency repair needs. Thus, the Agency cannot transform the portfolio into a modern system of the right type and size facilities in the right place for NOAA science. Disposing of unneeded facilities is a critical step in transforming the portfolio and building the foundation for 21<sup>st</sup> century science. NOAA will use the \$2 million to accelerate the disposal of surplus assets and reduce NOAA's footprint.

NOAA's effort to right size the property portfolio will be accelerated by eliminating arrangements that are not cost effective and disposing of excess and underutilized assets. In order to be meaningful, these efforts must be sustained in the out years to allow for further disposal of unwanted facilities, and compliance with all statutory, regulatory, and other requirements. NOAA will work closely with the General Services Administration to ensure excessing is done in accordance with all regulations and in the most effective way possible.

This increase will assist in NOAA's efforts to comply with statutory, regulatory, and other requirements governing facility management, such as the following:

- OMB M-12-12, in which agencies were directed to, "... not increase the size of their civilian real estate inventory..."
- Executive Order 13327, Federal Real Property Asset Management, which details the real property reporting and management requirements, "... in order to promote the efficient and economical use of Federal real property resources..."

**Statement of Need and Economic Benefits:**

Rising costs and decaying infrastructure are an increasing challenge for NOAA. Disposing facilities allows the Agency to use resources sensibly to maintain and improve the condition of critical facilities, instead of having to use those resources to maintain unwanted facilities. Through disposal, NOAA can provide the right facilities in the right locations, and use resources efficiently, enabling NOAA to more effectively achieve its mission.

**Resource Assessment:**

With current resources, NOAA must focus on emergency maintenance at the expense of initiating facility disposal activities. NOAA has not been able to reduce the facility footprint through disposal or remove unwanted facilities from the Agency's responsibility.

**Schedule and Milestones:**

- Dispose of surplus facilities (FY 2017–2020)

The time frame and resources needed to dispose of properties is highly variable due to needed environmental studies, site surveys, title search, appraisal, and restoration and remediation efforts. NOAA will dispose of properties in prioritized order based on a Line Office review of the list of properties and completing an estimate of the cost for environmental studies and disposal costs (either through demolition or excess through GSA excessing process) for each property.

**Deliverables:**

Detailed in the Performance Measure data below

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> Reduce unutilized owned real properties (annually)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	3	5	5	5	5
<b>Without Increase</b>	N/A	N/A	0	0	0	0	0
<b>Description:</b> NOAA will reduce the number of unutilized owned property by beginning the disposal process on five properties per year. The goal is to complete the process for identified properties by FY 2025. As of June 2015, 15 projects, totaling over 166,099 gross square feet, were on the disposal list.							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Mission Support  
**Sub-program:** Mission Services and Management  
**Program Change:** Accelerate NOAA Facility Disposal

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	0	75,752
11.3	Other than full-time permanent	0	617
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	390
11.9	Total personnel compensation	0	76,759
12	Civilian personnel benefits	0	21,699
13	Benefits for former personnel	0	257
21	Travel and transportation of persons	0	684
22	Transportation of things	0	267
23.1	Rental payments to GSA	0	9,258
23.2	Rental Payments to others	0	845
23.3	Communications, utilities and miscellaneous charges	0	4,338
24	Printing and reproduction	0	58
25.1	Advisory and assistance services	0	4,020
25.2	Other services	2,067	28,226
25.3	Purchases of goods & services from Govt accounts	0	140
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	624
31	Equipment	0	547
32	Lands and structures	0	1,630
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	72
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	2,067	149,424



**Payment to the DOC Working Capital Fund: Maintaining Capability in the DOC Working Capital Fund: (Base Funding: \$70,217,000 and 0 FTE; Program Change: +\$2,295,000 and 0 FTE)**: This increase of \$2,295,000 will 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's Congressional Submission document.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Mission Support  
**Sub-program:** Payment to the DOC Working Capital Fund  
**Program Change:** Departmental Working Capital Fund Increase

<b>Object Class</b>	<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11 Personnel compensation		
11.1 Full-time permanent	0	0
11.3 Other than full-time permanent	0	0
11.5 Other personnel compensation	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	0
12 Civilian personnel benefits	0	0
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	0
22 Transportation of things	0	0
23.1 Rental payments to GSA	0	0
23.2 Rental Payments to others	0	0
23.3 Communications, utilities and miscellaneous charges	0	0
24 Printing and reproduction	0	0
25.1 Advisory and assistance services	0	0
25.2 Other services	0	0
25.3 Purchases of goods & services from Gov't accounts	2,295	72,512
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	0
31 Equipment	0	0
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	0
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	2,295	72,512

**APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES**  
**SUB-PROGRAM: OFFICE OF EDUCATION**

**Office of Education**

The Office of Education (OED) provides advice and counsel to the Under Secretary of Commerce for Oceans and Atmosphere in matters pertaining to education and coordinates education activities throughout NOAA through the NOAA Education Council and represents the Agency in inter-agency education initiatives. The office fosters American competitiveness in science, technology, engineering, and mathematics (STEM) by providing quality educational opportunities for the next generation, including competitive scholarships, internships and professional training for post-secondary students. The Office of Education also supports Educational Partnership Program (EPP) with Minority Serving Institutions (MSI) grants, Hollings Scholarships, and Education Council and Interagency working group efforts. In FY 2015, OED working with the Education Council and the NOAA Education community as a whole 1) produced a strategic plan that better reflects how education supports NOAA's mission, 2) focused implementation on near-term priorities we will push the needle on, and 3) continued to improve capacity and the quality in monitoring and evaluation of these plans.

**Educational Partnership Program**

The Educational Partnership Program (EPP) with minority serving institutions provides financial assistance, through competitive processes, to students and to MSIs that train students and conduct research in NOAA mission sciences. The program's goal is to increase the number of students, particularly from underrepresented groups, who are trained and earn degrees in sciences directly related to NOAA's mission. Long term goals of the program include increasing the diversity of the STEM and NOAA workforce and fostering American competitiveness in STEM fields. Among EPP's accomplishments:

- Over 1,680 degrees granted to higher education students in NOAA mission fields since 2001
- 75 percent of graduates are from underrepresented minority groups
- 185 PhDs granted in NOAA mission disciplines
- 650 students in NOAA mission fields currently in the pipeline

**Ernest F. Hollings Scholarship Program**

The NOAA Ernest F. Hollings (Hollings) scholarship program increases undergraduate training in oceanic and atmospheric science, research, technology, and education improving environmental literacy and understanding. It recruits and prepares students for public service careers with NOAA and other natural resource and science agencies at the Federal, state and local levels of government and careers as teachers and educators in oceanic and atmospheric science and environmental education in the United States.

Based on the FY 2017 President's Request of \$5.85 billion, NOAA estimates it will have \$5.9 million for scholarships. Actual funding will be determined as provided in statute at one-tenth of one percent of the annual appropriation. For more information, please visit the Hollings Scholarship website: [www.oesd.noaa.gov/scholarships/hollings.html](http://www.oesd.noaa.gov/scholarships/hollings.html)

**Administration STEM Priorities**

NOAA's investments in STEM education are guided by the priorities outlined in the Federal STEM Education 5-Year Strategic Plan. NOAA focuses on increasing inclusion and diversity in

STEM education by providing quality educational opportunities for the next generation including competitive scholarships, internships, and professional training for post-secondary students.

**Schedule and Milestones:**

FY 2017

Educational Partnership Program and OED Student Opportunities

- Fund 2<sup>nd</sup> year of 5-Year Cooperative Science Centers financial awards

FY 2017-2021

Intra/Inter-agency Coordination of STEM Education Activities

- Lead monthly Education Council meetings
- Co-lead bi-monthly Interagency Working Group on Ocean Education meetings
- Lead two monthly education working group meetings
- Assist OMB and lead STEM agencies in executing Administration’s STEM initiative
- Participate in regular meetings of Interagency STEM Working Groups on Graduate Fellowships, Undergraduate Education, and Broadening Participation
- Participate in three quarterly meetings of the Committee on Equal Opportunity in Science and Engineering

**Deliverables:**

Educational Partnership Program

- Award 5-12 EPP Undergraduate Scholarships
- Award 4 Cooperative Science Centers Cooperative Agreements

OED Student Opportunities

- Award 125 -150 Hollings Scholarships

Intra/Inter-agency Coordination of STEM Education Activities

- Chair 12 Education Council meetings
- Chair 12 Interagency Working Group on Ocean Education meetings
- Chair 24 education working group meetings

**Performance Goals and Measurement Data:**

Consistent with the recommendations from the National Research Council study of NOAA’s education program conducted in 2010, as well as the Department’s review through the Balanced Scorecard process, the Office of Education has refined the performance measures for education programs. As the Office of Education progresses in implementing NOAA Education’s Monitoring and Evaluation framework, it is anticipated that performance measure will continue to be refined.

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Number of EPP students supported with NOAA funding who are awarded NOAA mission-related STEM post-secondary degrees	90	90	90	90	90	90	90

**Description:** This metric represents all components of EPP including the Cooperative Science Centers and Scholarships. The NOAA EPP supports development of programs to educate and graduate students for the next-generation workforce and to increase the number of competent individuals with the knowledge and skills to support NOAA STEM activities. EPP graduates will lead innovation and technologies to enhance NOAA services and stewardship while supporting global competitiveness to advance national economic growth.  
\*Cooperative Science Center Awards end in FY 2016.

<b>Performance Measure:</b> Number of EPP students from underrepresented communities supported by NOAA funding who are awarded NOAA mission-related STEM post-secondary degrees	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	60	60	60	60	60	60	60

**Description:** It represents all components of EPP using the NOAA-wide Education metrics. The NOAA EPP funding is developing education/engagement and research programs to increase the number of undergraduate and graduate students, from underrepresented communities, who complete degrees in NOAA mission-relevant STEM disciplines and are prepared to enter NOAA mission-relevant STEM careers or advanced education.  
[www.epp.noaa.gov/docs/csc\\_contributions\\_STEM\\_pool.pdf](http://www.epp.noaa.gov/docs/csc_contributions_STEM_pool.pdf)

<b>Performance Measure:</b> Number of EPP students hired by NOAA, NOAA contractors and other natural resource and science agencies at the Federal, state, local and tribal levels; private sector and academia	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	40	40	40	40	40	40	40

**Description:** The EPP aligns with NOAA mission priorities and includes education, engagement, and NOAA STEM research programs to develop students with NOAA mission-critical STEM knowledge and skills. With the collaboration and mentoring by NOAA scientists, program graduates may pursue careers at NOAA and become part of the scientific and technological workforce at resource management agencies, in the private sector and in academia. The ongoing program evaluation should improve the accuracy of this metric.  
[www.epp.noaa.gov](http://www.epp.noaa.gov)

<b>Performance Measure:</b> Number of collaborative research projects undertaken between NOAA and EPP in support of NOAA mission	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	85	85	85	85	85	85	85

**Description:** Each NOAA Cooperative Science Center (CSC) aligns with specific NOAA Line Organizations and collaborates with NOAA scientists and engineers conducting research to better understand the significance of changes in the Earth's oceans, coasts, Great Lakes, weather, and climate.

<b>Performance Measure:</b> Institutions served by Competitive Education Grants (actual numbers, NOT in thousands)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	23	15	8	8	0	0	0
<b>Description:</b> Number of institutions with active multi-year NOAA Competitive Grants that support STEM-related education exhibits and programs							

<b>Performance Measure:</b> K-12 students served by Competitive Education Grants and B-WET (in thousands)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	70.5	0.975	0.52	0.52	0	0	0
<b>Description:</b> Number of K-12 students that benefit from learning materials, hands-on experiential activities, and other STEM education programming and resources supported by NOAA's Competitive Education Grants and B-WET							

<b>Performance Measure:</b> K-12 teachers and staff served by Competitive Education Grants and B-WET (in thousands)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	7.6	2.9	1.6	1.6	0	0	0
<b>Description:</b> Number of K-12 teachers and informal education staff that benefit from professional development opportunities and curriculum materials supported by NOAA's Competitive Education Grants and B-WET.							

<b>Performance Measure:</b> Number of people that visit informal learning institutions with a NOAA-funded exhibit or program that integrates NOAA sciences data and other information (in thousands)	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
	46,350	26,125	16,350	0	0	0	0
<b>Description:</b> This performance measure measures the number of people (annually) that visit museums, zoos and aquariums with high quality and effective STEM exhibits or programs incorporating NOAA's science or services. NOAA's science products and services are unique among the federal government and academia. The exhibits and programs funded through Competitive Education Grants incorporate these unique assets and capabilities into interactive exhibits that immerse the general public in these real-world and current issues. NOAA's products and services are essential to explaining critical STEM issues such as climate change, oil spills, extreme weather and weather safety, appropriate management of coastal environments, and overfishing.							

**PROGRAM CHANGES FOR FY 2017:**

**Office of Education: Office of Education (Base Funding: \$19,481,000 and 23 FTE; Program Change: -\$3,000,000 and 0 FTE):** NOAA requests a decrease of \$3,000,000 and 0 FTE for a total of \$16,481,000 and 23 FTE to fund NOAA's Office of Education (OEd). This reduction will terminate NOAA's Competitive Education Grants program. Of the \$16,481,000 remaining, NOAA will use \$2,050,000 for OEd operations and \$14,431,000 to support the Educational Partnership Program (EPP). While the Competitive Education Grants will be terminated NOAA will still support teacher development and formal and informal education initiatives through the existing grant periods (3-5 years) due to the multi-year nature of prior year awards.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** Mission Support  
**Subprogram:** Office of Education  
**Program Change:** Office of Education

<b>Object Class</b>	<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11 Personnel compensation		
11.1 Full-time permanent	0	2,110
11.3 Other than full-time permanent	0	49
11.5 Other personnel compensation	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	2,159
12 Civilian personnel benefits	0	589
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	158
22 Transportation of things	0	4
23.1 Rental payments to GSA	0	90
23.2 Rental Payments to others	0	229
23.3 Communications, utilities and miscellaneous charges	0	71
24 Printing and reproduction	0	6
25.1 Advisory and assistance services	0	92
25.2 Other services	0	642
25.3 Purchases of goods & services from Gov't accounts	0	1,762
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	61
31 Equipment	0	33
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	(3,000)	17,785
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	(3,000)	23,681



**Office of Education: Bay-Watershed Education and Training (B-WET) Program (Base Funding: \$7,200,000 and 0 FTE; Program Change: -\$7,200,000 and 0 FTE):** NOAA requests a decrease of \$7,200,000 and 0 FTE for a total of \$0 and 0 FTE to terminate the Bay-Watershed Education and Training (B-WET) Program. NOAA's operating plan for FY 2016 provided \$7,200,000 for B-WET regional programs, which promote place-based, experiential learning in K-12 Science, Technology, Education, & Mathematics (STEM) education. With these funds NOAA supported Meaningful Watershed Educational Experiences (MWEE) through competitive funding to local and state education offices and government agencies, academic institutions, and nonprofit organizations. MWEEs integrate field experiences with multi-disciplinary classroom activities and instruction in NOAA-related sciences. 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.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Program Support  
**Subprogram:** Office of Education  
**Program Change:** Bay-Watershed Education and Training (B-WET) Program

<b>Object Class</b>	<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11 Personnel compensation		
11.1 Full-time permanent	0	2,110
11.3 Other than full-time permanent	0	49
11.5 Other personnel compensation	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	2,159
12 Civilian personnel benefits	0	589
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	158
22 Transportation of things	0	4
23.1 Rental payments to GSA	0	90
23.2 Rental Payments to others	0	229
23.3 Communications, utilities and miscellaneous charges	0	71
24 Printing and reproduction	0	6
25.1 Advisory and assistance services	0	92
25.2 Other services	0	642
25.3 Purchases of goods & services from Gov't accounts	0	1,762
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	61
31 Equipment	0	33
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	(7,200)	13,585
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	(7,200)	19,481

## **APPROPRIATION ACCOUNT: PROCUREMENT, ACQUISITION, AND CONSTRUCTION SUB-PROGRAM: CONSTRUCTION**

The objective of the Construction sub-program is to ensure that NOAA has safe, sound, secure, and modern facilities and infrastructure to support NOAA's critical science, stewardship, and environmental intelligence mission. The Construction sub-program accomplishes this objective through a) construction planning and b) construction project management and execution. NOAA's facilities constitute a significant capital investment and are integral to NOAA's mission. NOAA uses approximately 785 different facilities (both owned and leased) with a current replacement value (CRV) of over \$5 billion. Of that, more than 50 percent (455) are owned and operated by NOAA with a CRV of approximately \$2.4 billion. These facilities require maintenance, repair, and investment needed to keep them safe, secure, and environmentally sound.

Construction planning enables NOAA to complete the studies, pre-design work, and initial preparation that make the actual construction phase of projects more efficient and effective. Activities include NEPA planning, special environmental studies, condition surveys, site work, and any other preliminary development needed to ensure successful completion of construction projects within budget and on schedule.

Constructing new facilities and reinvesting in existing facilities ensures NOAA facilities are aligned with its mission and improves facility condition across our portfolio. Additionally, conducting and effectively managing construction projects on facilities that have major deferred maintenance issues corrects health and life safety issues, averts emergency repairs and associated costs, reduces energy costs through creation of more efficient and sustainable building systems, and brings facilities up to modern standards to make them easier to maintain. NOAA currently is working to measure facility condition comprehensively across the agency. NOAA and the Department of Commerce prioritize individual projects that are critical to NOAA's mission accomplishment and request funding to execute said projects.

### **Schedule and Milestones:**

- Award Newport Pier Study Planning and Design Contract (2016)

### **Deliverables:**

- Naval Station Newport Pier Study

## PROGRAM CHANGES FOR FY 2017:

**NOAA Construction: National Marine Fisheries Service Facilities Initiative: (Base Funding: \$1,000,000 and 0 FTE; Program Change: +\$3,557,000 and 2 FTE):** NOAA requests \$3,557,000 and 2 term FTE for a total of \$4,557,000 and 2 FTE to prepare for replacement of the National Marine Fisheries Service's (NMFS) Northwest Fisheries Science Center (NWFSC) facility in Mukilteo, Washington.

### **Proposed Actions:**

The Mukilteo Research Station (MRS) has been at the forefront of ecosystem recovery and marine pollution research in the Pacific Northwest for four decades. The multidisciplinary research conducted at the MRS supports the commercial and recreational fisheries in the Northwest, which generate \$14.7 billion in sales and 167,000 jobs<sup>3</sup>. The lab also plays a key role in NOAA's applied science mission nation-wide due to a location on the Puget Sound that allows access to very deep, pure seawater close to shore. The science conducted at Mukilteo depends on the continuous daily pumping of approximately 300,000 gallons of this high quality seawater, with a purity level for rearing and maintaining commercially valuable and ecologically important fish and invertebrate species. Access to water of similar quality is not available at other NOAA sites in the Pacific Northwest, making the MRS location critical for the continuation of this national scientific work.

The aging facilities of MRS, however, pose a near-term safety risk to the organization and negatively impact NOAA's mission and operations. The condition of the existing structure has reached a point where staff had to be temporarily evacuated for safety concerns that were addressed through temporary stabilization of the building's infrastructure. Major investment in repairs or modernization would not be cost-effective, as the work required to extend the life of this building for any meaningful period is too great. (Further discussion and pictures of the facility issues are provided in the "Statement of Need" section.) As a result, replacing the facility is critical.

Through NOAA construction planning, this project was identified as a NOAA-wide priority and a Business Case Analysis (BCA) was conducted to evaluate options for MRS. NOAA's Office of the Chief Administrative Officer (CAO) works with NOAA leadership to prioritize critical facility projects across the NOAA portfolio and uses BCAs as a tool to document project planning and decision processes. The Mukilteo BCA documents specific mission requirements, and evaluates locations, extensive facility and seawater system options, and 30 year costs. Based on recommended alternatives identified in the BCA, NOAA requests \$4,557,000 in FY 2017 to prepare for the construction of a new facility and seawater system. ]

The FY 2017 funding requested will be for the following activities:

- **Project Management:** Commensurate with the scale and scope of construction project complexity for a \$25 - \$35M scientific facility, NOAA is requesting two term FTEs to support management of the project.
- **Site Preparation and Fill:** To reduce risks of flooding from both sea level rise and more extreme events (e.g., higher king tides) in the future, the land will be raised using fill. Additionally, raising the land will reduce potential risk of construction disturbing Native American midden<sup>4</sup> sites that

<sup>3</sup> Data for OR, WA and AK: National Marine Fisheries Service. 2015. Fisheries Economics of the United States, 2013. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS-F/SPO-159, 240p. <https://www.st.nmfs.noaa.gov/Assets/economics/publications/FEUS-2013/documents/01-TOC-Preface.pdf>.

<sup>4</sup> Midden: An archeological feature. A mound or deposit containing shells, animal bones, and other refuse that indicates the site of a human settlement. According to the draft environmental impact statement for the Washington Department of Transportation's Mukilteo Multimodal

can be found in the area. Preliminary estimates for appropriate fill height calls for raising the land four to seven feet. (Note: this is subject to change based on preliminary work). NOAA will also confer with the City of Mukilteo on their plans for adjoining property, to ensure continuity of work between Federal and city property.

- Shoreline Protection: NOAA will reinforce existing shoreline armoring so that the property is less susceptible to damage from high water.
- NEPA Process, Consultations, and Assessments: NOAA will contract for support services to evaluate the environmental impacts of the proposed action to consider options to mitigate any potential issues, perform any required consultations, and conduct any site assessments required for moving forward.
- Design Package: Funding will support contract services for a building design.

To develop this property under the preferred option identified in the BCA, NOAA will need to complete a land swap with the City of Mukilteo's eastern adjacent parcel (Figure 1, land swap area would fall somewhere within the area labelled Option 3). This will ensure the new facility is not built in the 100 year floodplain and that the parcel has reduced public frontage to improve security. Congressional authority will be needed for the land swap. However, if the exchange of land does not happen, NOAA will default to remaining in the current parcel of ownership and construct a new building in the eastern-most portion of the property outside of the 100 year flood plain. NOAA will also replace the existing pier-based seawater system with a siphon-based system, upgrade pumps to meet flow requirements, and remove the existing system, which is outdated, inefficient, and does not have full redundancy (i.e., backup capability in the event of primary system failure). The siphon-based system is preferable due to significantly lower costs (installation and operations/maintenance) and easier maintenance.

The new facility will create a modernized, safe, secure, environmentally sound, and cost-effective science center that improves NOAA programmatic functions and ensures that NOAA will be better equipped to support its scientific mission and provide its external customers the best service possible.



Figure 1: The approximate location for the recommended alternative identified in the BCA and approved by the NOAA Program Management Council is shown here in the shaded area labeled “Option 3.” The red area on the left represents the 100 year floodplain.

**Statement of Need and Economic Benefits:**

The Northwest Fisheries Science Center’s Mukilteo Research Station has been at the forefront of ecosystem recovery and marine pollution research in the Puget Sound for four decades. NOAA’s Mukilteo scientists were among the first to study the effects of contaminants on fish health in Puget Sound, and are currently exploring the ecological impacts of human activity, including shoreline development and stormwater runoff. These research efforts are critical priorities for NOAA and Washington State under the Puget Sound Partnership to recover the Sound by 2020.

Research at the Mukilteo station is also helping the agency address critical data gaps in ecosystem-based management and conservation and advance recovery of endangered and threatened Pacific salmon. Newer initiatives include understanding the threats that emerging pollutants and ocean acidification have on the health of coastal areas of the California Current, the Puget Sound ecosystem, and the Nation. Ocean acidification is a major oceanographic and economic challenge threatening marine ecosystems and industries that depend on them, such as the Nation’s shellfish industry. Also, MRS’ recent nationally significant studies on the impacts of oil spills on fish early life stages and on seafood safety and quality have contributed to understanding effects of disasters like Hurricane Katrina and the Deepwater Horizon oil spill. The cutting-edge fisheries research at Mukilteo supports NOAA’s efforts to understand and minimize the impacts of human activities and changing ocean conditions on the Nation’s trust resources.

The research programs at the MRS have also led to productive collaborations with a wide range of partnering institutions (e.g., universities, state and Federal agencies, non-profits, and local tribes),

working on regional issues that can only be addressed collectively. In addition to attracting these partnerships, the facility has garnered strong support from the local community. This is no surprise given that the research programs here help support commercial and recreational fisheries in Washington State valued at \$8 billion in sales and supporting 65,000 jobs.<sup>5</sup>

Facility safety issues are threatening NOAA's ability to conduct its mission critical science at this location. The main Mukilteo Building (built in 1942) has significant structural and interior deterioration (Figure 2). NOAA has utilized the property for fisheries science research since 1972 and took over ownership of the facility from the Air Force in 2013. A recent site inspection (December 2014) found that immediate stabilization of the foundation was needed to render the building safe for occupancy and the building was immediately evacuated until emergency temporary repairs could be completed (Figure 3). However, the temporary foundation stabilization work (jack network) only extends the site's certification for occupancy by up to five years and will require continuous monitoring and annual inspections by a qualified engineer. The NWFSC cannot use the facility in its current condition for more than five years (the maximum length of time for which the foundation stabilization can be certified).

While NOAA will intensively manage the facility to meet safety requirements for that period of time, the overall condition is well below what is acceptable for a modern scientific laboratory. It is not cost effective to continue to invest in the existing building. Failure to address this situation will severely impact the mission critical research conducted at this facility.



Fig. 2: Cracked walls from shifting foundation. Fig. 3: Jack network supporting the foundation.

In addition to major structural issues, the major systems of the facilities remain in disrepair and affect efficient operations. For example, the boiler is old and inefficient, providing heat through an antiquated and un-insulated piping distribution system. The building envelope, heating system, and asbestos-containing materials all require a major investment for corrections. Replacement of the current facility will not only address existing safety and efficiency issues, but will also allow proper siting of the facility on the property to mitigate potential flooding issues due to tidal surge and sea level rise. Currently the west end of the property, on which the Main Building is located, is prone to flooding during the highest tides of the year.

#### Resource Assessment:

<sup>5</sup> National Marine Fisheries Service. 2014. Fisheries Economics of the United States, 2012. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS-F/SPO-137, 175p. Available at: <https://www.st.nmfs.noaa.gov/st5/publication/index.html>.

Since taking possession of the building in 2013, NMFS has invested \$313,400 to correct the most significant safety and security deficiencies at Mukilteo. Other deficiencies remain unaddressed. As noted above, while NOAA has focused on temporary foundation stabilization and roofing to ensure safe use in the short-term, the building envelope, heating system, and asbestos containing materials all require a major investment. Maintenance and repairs to continue operations on the dilapidated facility erode base funding necessary for traditional upkeep of modern day facilities. The major investment required for this facility exceeds current base resources. More importantly, the condition of the existing structure has reached a point that any major investment would not be cost-effective, as it would not extend the life of this building for any meaningful period of time.

**Schedule and Milestones:**

- FY 2017: See above: Proposed Actions, FY 2017 Activities and Costs
- FY 2017 - 2018: Construction and commissioning<sup>6</sup> ongoing
- FY 2019 – 2020: Construction and commissioning completed; occupancy and close-out

**Deliverables:**

- Building ready for occupancy

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Cumulative number of living marine resources characterized for vulnerability to ocean acidification							
<b>With Increase</b>	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Without Increase</b>	50	55	60	65	70	75	80

*\*Assumption based on Business Case Analysis: New building ready for occupancy in April 2020 (Q3 FY 2020).*

**Description:** Cumulative number of economically important species (or species on which those commercially important species rely) whose vulnerability to ocean acidification NOAA has tested. These targets reflect work at laboratories around the country, not just at the Mukilteo Research Station (MRS). The MRS is currently the only Federal lab funded by the NOAA Ocean Acidification program looking at ocean acidification impacts on West Coast (California Current) species. The results of this research are important inputs into a variety of models, such as fisheries harvest and socioeconomic models, which contribute to fisheries management decisions.

*Due to the timeline for this project, it is not possible to show measurable changes to targets within the scope of the performance period above. Benefits will not be measurable until FY 2022. If the new building is ready for occupancy in mid-FY 2020, it will take the remainder of FY 2020 and potentially into mid-FY 2021 for the experimental systems in the new building to become fully operational (setup, troubleshooting, etc.). This benefit of the new building will materialize beyond FY 2021 when the number, quality, and depth of the experiments can increase. Under this scenario, the ocean acidification research conducted at MRS will contribute two additional species “With Increase” in FY 2022 (for a cumulative number of 87 for the national Ocean Acidification Program). Without increase, no further characterizations of northern California Current species are anticipated beyond FY 2020 due to failure of the existing facility.*

<sup>6</sup> Commissioning refers to the process of assuring that all systems and components of the new construction are designed, installed, tested, operated, and maintained according to NOAA’s operational requirements.



**Out-year Funding Estimates (\$ in thousands):**

<b>NOAA Fisheries Facilities: Mukilteo</b>	<b>FY 2016 &amp; Prior</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>CTC</b>	<b>Total</b>
<b>Change from FY 2017 Base</b>	\$0	\$4,557	\$28,384	\$0	\$0	\$0	\$0	\$0
<b>Total Request</b>	\$0	\$4,557	\$28,384	\$0	\$0	\$0	\$0	\$32,941

**PROGRAM CHANGE PERSONNEL DETAIL**

**Budget Program:** Mission Support  
**Sub-program:** NOAA Construction  
**Program Change:** NOAA Fisheries Facilities Initiative

<b>Title:</b>	<b>Location</b>	<b>Grade</b>	<b>Number of Positions</b>	<b>Annual Salary</b>	<b>Total Salaries</b>
Project Manager	Silver Spring, MD	ZA-IV	1	90,823	90,823
Mechanical Engineer	Silver Spring, MD	ZA-IV	1	90,823	90,823
<b>Subtotal</b>			<u>2</u>		<u>181,646</u>
2016 Pay Adjustment (1.3%)					<u>2,361</u>
<b>Total</b>					<u>184,007</u>
less Lapse		25%	<u>0</u>		<u>45,412</u>
Total full-time permanent (FTE)			2		<u>138,596</u>
2017 Pay Adjustment (1.6%)					<u>2,218</u>
TOTAL					<u>140,813</u>

**Personnel Data**

	<u>Number</u>
Full-Time Equivalent Employmen	
Full-time permanent	2
Other than full-time permanent	<u>0</u>
Total	2

Authorized Positions:

Full-time permanent	2
Other than full-time permanent	<u>0</u>
Total	2

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
(Dollar amounts in thousands)

**Budget Program:** Mission Support  
**Sub-program:** NOAA Construction  
**Program Change:** NOAA Fisheries Facilities Initiative

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	141	141
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	141	141
12	Civilian personnel benefits	56	56
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	3,916	4,916
25.2	Other services	444	444
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	4,557	5,557

**NOAA Construction: Naval Station Newport Pier Study (Base Funding: \$1,000,000 and 0 FTE; Program Change: -\$1,000,000 and 0 FTE):** NOAA requests a decrease of \$1,000,000 and 0 FTE for a total of \$0 and 0 FTE for completion of a Planning and Design study.

**Proposed Actions:**

In FY 2016, NOAA requested one-time funding to conduct a Planning and Design study to potentially extend NOAA's use of the Naval Station Newport pier in Newport, RI. The funding requested in 2016 is sufficient to complete the study and no further funding is required.

**Resource Assessment:**

There are no further funding requirements for this study.

**Schedule and Milestones:**

N/A

**Deliverables:**

N/A

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Mission Support  
**Sub-program:** NOAA Construction  
**Program Change:** Naval Station Newport Pier Study

<b>Object Class</b>		<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	0	0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	0
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	(1,000)	0
25.2	Other services	0	0
25.3	Purchases of goods & services from Govt accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	(1,000)	0

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## **BUDGET PROGRAM: OFFICE OF MARINE AND AVIATION OPERATIONS**

For FY 2017, NOAA requests a total of \$289,298,000 and 955 FTE for the Office of Marine and Aviation Operations, including a net decrease of \$49,050,000 and 0 FTE in program changes.

### **Office of Marine and Aviation Operations Overview**

NOAA's Office of Marine and Aviation Operations (OMAO) manages an array of specialized ships and aircraft that play a critical role in the in-situ collection of oceanographic, atmospheric, hydrographic, and fisheries data in support of NOAA's environmental and scientific missions. OMAO additionally administers the NOAA-wide Diving Program as well as the Small Boat Program. The staff is composed of civilians along NOAA Commissioned Officer Corps (NOAA Corps) officers.

The NOAA fleet operates throughout the world supporting a wide array of NOAA missions including fisheries research, nautical charting, hurricane reconnaissance and research, snow surveys, and specialized atmospheric and ocean research. NOAA ships range from global class oceanographic research vessels capable of exploring the world's deepest oceans to regional class ships responsible for charting the shallow bays and inlets of the United States. NOAA aircraft range from the four engine WP-3D, capable of penetrating hurricanes, to the De Havilland Twin Otters, well-suited for marine mammal surveys where slower airspeeds and higher endurance are essential.

In addition to the research and monitoring activities, NOAA ships and aircraft provide an immediate response capability. Following major natural and environmental disasters, NOAA ships and aircraft can conduct emergency navigation hazard surveys that help ports reopen quickly and obtain aerial images of disaster-torn areas. Emergency hazard surveys provide critical information for first responders, disaster response, and resident; this information provided by NOAA assets is often the only source of data.

OMAO is charged with the safe and efficient operation and maintenance of the NOAA fleet. OMAO develops annual fleet allocation plans, conducts lifecycle maintenance, and provides centralized fleet management including: standard procedures, safety inspections, and medical services in partnership with the U.S. Public Health Service Commissioned Corps. OMAO maintains a safe field environment through the coordination of training and certification of officers, crew members, and scientists in at-sea and airborne safety procedures.

The NOAA Corps commands and supports the fleet, as well as provides support to NOAA Line Offices. OMAO manages the recruitment, training, personnel assignments, and payroll for the NOAA Corps.

OMAO has two sub-programs under the Operations, Research, and Facilities (ORF) account (\$215,287,000 and 949 FTE).

- Marine Operations and Maintenance (\$182,376,000 and 828 FTE)
- Aviation Operations (\$32,911,000 and 121 FTE)

In addition, OMAO has one sub-program in the Procurement, Acquisition, and Construction account (\$91,750,000 and 6 FTE):

- Fleet Replacement (\$91,750,000 and 6 FTE), which includes the Fleet Capital Improvements and Technology Infusion (\$11,700,000 and 1 FTE) and the New Vessel Construction Program, Project, or Activity (\$80,050,000 and 5 FTE) (PPA) lines.

The OMAO budget includes the following other mandatory and discretionary accounts:

- NOAA Commissioned Officer Corps Retirement Pay (\$29,375,000 and 0 FTE)
- Medicare-Eligible Retiree Healthcare Fund (\$1,936,000 and 0 FTE)

**Significant Inflationary Adjustments:**

NOAA’s FY 2017 Base includes a total of \$4,042,000 and 0 FTE to account for the full funding requirement for inflationary adjustments to current programs for OMAO activities. This includes the estimated 2017 Federal pay raise of 1.6 percent and military pay raise of 1.6 percent as well as inflationary increases for non-labor activities, including service contracts, utilities, field office lease payments, and rent charges from the General Services Administration (GSA).

NOAA also requests the following transfer for a net change of \$0 and 0 FTE to the agency:

<b>From Office</b>	<b>PPA</b>	<b>To Office</b>	<b>PPA</b>	<b>Amount/FTE</b>
MS	Mission Services and Management	OMAO	Marine Operations and Maintenance	\$114,000/0 FTE

NOAA requests to transfer \$114,000 and 0 FTE to move funding associated with NOAA’s Western Regional Center (WRC) management activities from Mission Support Facilities to OMAO. Currently, costs for these activities are paid directly through the funding appropriated to the Mission Services and Management PPA. This reallocation supports NOAA’s plan to employ an integrated campus cost model to allocate the cost of services provided to the WRC tenants. The tenants will then be billed directly based on the approved cost model. An integrated cost model will provide greater transparency and a more accurate reflection of program operating costs.



## **APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES**

### **SUB-PROGRAM: MARINE OPERATIONS AND MAINTENANCE**

The Marine Operations and Maintenance (MOM) sub-program supports centralized management for NOAA's 16 active research and survey ships. Research and survey vessels are categorized by class – Global, Ocean, and Regional – based on size and capability. Global class vessels are the largest and have the endurance to work globally and accommodate large groups of scientists. Ocean class vessels are designed to support integrated interdisciplinary research and survey missions and generally operate domestically, with capability for some global work. Regional class vessels operate on the continental shelf and in the open ocean of specific geographic regions. Regional vessels capabilities allow them to work within specific regional environments such as shallow areas like estuaries and bays, under seasonally harsh weather conditions unique to their region of operation.

NOAA vessels are capable of conducting operations that support NOAA's programs in nautical charting, bathymetric mapping, fisheries stock assessments and research, ecosystem assessments, marine environmental baseline assessments, coastal-ocean circulation, and oceanographic and atmospheric research. In FY 2017, OMAO plans to provide approximately 3,330 Days at Sea (DAS) to support NOAA's highest-priority programs. Additional DAS also may be funded by programs as determined during the year of budget execution, based on the availability of vessels and funds.

Regular maintenance allows NOAA ships to meet the rigorous demands of its scientific, forecasting, and regulatory missions. MOM funding provides for general operational maintenance and repair of NOAA ships, including critical scientific and technical equipment necessary to meet ongoing stakeholder requirements.

The NOAA fleet must adhere to various requirements and regulations related to safety and emissions put forth by the three following organizations. The American Bureau of Shipping (ABS) certifies ships as seaworthy. OMAO uses ABS rules to design its maintenance program and conduct Ship Structure and Machinery Evaluations (SSME) on the NOAA Fleet. Under the Clean Air Act, the Environmental Protection Agency (EPA) promulgates regulations governing airborne emissions that affect ship engine and exhaust components. The U.S. Coast Guard (USCG) promulgates regulations on all discharges from ships so that marine environments are protected from harmful discharges.

The Marine Operations and Maintenance sub-program:

- ensures the operational readiness and maximum capability of the NOAA Fleet in support of present and future NOAA data collection
- provides properly trained personnel, as well as fuel, warehousing, laboratory and deck equipment, and other scientific equipment necessary to meet user requirements and schedules
- develops, with the guidance of the Fleet Council and with the implementation of the Prioritization, Allocation, and Scheduling (PAS) process, annual ship allocation schedules based on program requirements and available funds
- provides centralized management and coordination of scheduling, port services, operating procedures, and engineering support for NOAA's ships
- conducts Work Definition conferences to prioritize tasks and determine availability for dockside and drydock repairs, and planning for cyclic depot-level capital investments across the Fleet that are supported by the Procurement,

Acquisition, & Construction funds of the Progressive Lifecycle Maintenance program.

- trains and qualifies NOAA personnel to ensure safe and effective diving operations
- trains and certifies NOAA Corps officers, crew, and scientists in at-sea safety requirements for their positions according to the Standards of Training, Certification and Watchkeeping for Seafarers and the International Maritime Organization conventions
- provides oversight and support to enhance safety of NOAA's small-boat operations

NOAA Fleet detail for FY 2017 is provided below:

Vessel	Length	Class	Mission	Home Port	Status
<i>Ronald H. Brown</i>	274 ft.	Global	1,4	Charleston, SC	Active
<i>Rainier</i>	231 ft.	Ocean	3	Newport, OR	Active
<i>Fairweather</i>	231 ft.	Ocean	3	Ketchikan, AK	Active
<i>Oregon II</i>	170 ft.	Regional	2	Pascagoula, MS	Active
<i>Thomas Jefferson</i>	208 ft.	Ocean	3	Norfolk, VA	Active
<i>Gordon Gunter</i>	224 ft.	Ocean	2	Pascagoula, MS	Active
<i>Oscar Elton Sette</i>	224 ft.	Ocean	2	Honolulu, HI	Active
<i>Nancy Foster</i>	187 ft.	Ocean	1,4	Charleston, SC	Active
<i>Hi'ialakai</i>	224 ft.	Ocean	1,4	Honolulu, HI	Active
<i>Oscar Dyson</i>	209 ft.	Ocean	2	Kodiak, AK	Active
<i>Henry B. Bigelow*</i>	209 ft.	Ocean	2	Newport, RI	Active
<i>Pisces</i>	209 ft.	Ocean	2	Pascagoula, MS	Active
<i>Bell M. Shimada</i>	209 ft.	Ocean	2	Newport, OR	Active
<i>Okeanos Explorer</i>	224 ft.	Ocean	1	Davisville, RI	Active
<i>Ferdinand R. Hassler</i>	123 ft.	Regional	3	New Castle, NH	Active
<i>Reuben Lasker</i>	209 ft.	Ocean	2	San Diego, CA	Active
Mission: 1 = Oceanographic Research 2 = Fisheries Research			3 = Hydrographic Surveys 4 = Environmental Assessment		
* The <i>Henry B. Bigelow</i> is temporarily berthed in Newport, RI.					

**OMAO HQ also administers the following NOAA-wide activities:**

NOAA Dive Program: The NOAA Dive Center (NDC) provides diver certification, technical advice, and a standardized equipment program. The NDC, in cooperation with the NOAA Diving Control and Safety Board (NDCSB), also promulgates regulations, policies, standards, and safe diving procedures and practices. NOAA maintains approximately 360 divers who perform over 10,000 dives annually in support of NOAA's mission and mandates and programmatic goals and objectives. Fleet diving activities include ship husbandry tasks such as cleaning propellers and sea strainers, conducting hull surveys for damage, and installing transducers. NOAA divers' work includes installation of tide gauges and other observing systems. Scientists trained as divers also study and describe the special places and species that NOAA is mandated to protect and manage. These activities enable us to meet mission and mandates, enhance customer service, operational safety, and facilitate self-sufficiency at sea.

**NOAA Small Boat Program (SBP):** The SBP is designed to reduce risk, promote standardization, and enhance the safety of NOAA’s small-boat operations. NOAA maintains approximately 350 small boats, which are operated and funded within the Line Offices. The SBP oversees the boats and conducts small-boat inspections, facilitates small boat related training by hosting workshops and sharing related information, and provides technical and engineering assistance to the NOAA Small Boat Safety Board and Line Offices concerning small boats.

**Schedule and Milestones:**

- Annual ship schedules and milestones are governed by the Fleet Allocation Plan (<http://www.oma.noaa.gov/shipallocation.html>) as agreed to and signed by the NOAA Fleet Council. The Fleet Allocation Plan details the objective and duration of individual NOAA projects.
- All ships have a set drydock and dockside repair maintenance period based on ABS scheduling by ship class.

**Deliverables:**

FY 2017:

In FY 2017, OMAO plans to provide the equivalent of 3,330 DAS (assuming a fuel price of \$2.97 per gallon<sup>1</sup>). Charter vessels will be used when NOAA vessels are unable to meet the Line Office (LO) requirements based on schedule or capability. Detailed deliverables are determined on a project-by-project basis as documented in sailing instructions agreed to by OMAO and the respective LO.

- Perform Program-Funded DAS as scheduled. In addition to OMAO-funded DAS, OMAO conducts mission funded days at sea referred to as Program-Funded days-at-sea (PFD), through Service Level Agreements (SLA) with NOAA programs as well as reimbursable agreements with other agencies, such as the Environmental Protection Agency and Bureau of Ocean Energy Management. PFD are scheduled based on availability of ships and program funds.

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
OMAO funded Days at Sea							
16 Active Ships	2,546	2,799	3,330	3,330	3,330	3,330	3,330
<b>Description:</b> OMAO base-funded Days at Sea in support of NOAA’s programs such as nautical charting, bathymetric mapping, fisheries stock assessments and research, ecosystem assessments, marine environmental baseline assessments, coastal-ocean circulation, and oceanographic and atmospheric research. For FY 2017 and forward, NOAA assumes a fuel rate of \$2.97 per gallon consistent with DLA standard fuel prices for FY 2016.							

<sup>1</sup> A fuel estimate of \$2.97 per gallon is consistent with the Defense Logistics Agency (DLA) Energy Standard Rate for FY2016 (effective October 8, 2016. OMAO purchases around 90% of fuel annually from DLA fuel sources through the SEA Card® program and through direct purchases from DLA fuel depots.

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Fleet Utilization							
16 Active Ships	68%	74%	89%	89%	89%	89%	89%
<b>Description:</b> The Fleet Utilization Rate is calculated by taking the base-funded Days at Sea (DAS) and dividing it by the maximum operating tempo of 235 DAS per active ship. In FY 2017 and forward, NOAA assumes 16 active ships at a fuel rate of \$2.97 per gallon consistent with DLA standard fuel prices for FY 2016.							

<b>Performance Measure:</b>	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
Reduce the hydrographic survey backlog within navigationally significant areas (Indicator 3.3h)	3,135	2,509	2,953	2,953	2,953	2,953	2,953
<b>Description:</b> NOAA conducts hydrographic surveys to determine bathymetry primarily in U.S. waters significant for navigation. This activity includes the detection, location, and identification of wrecks and obstructions with side scan and multi-beam sonar technology. NOAA uses the data to produce nautical charts in a variety of formats.							

## **PROGRAM CHANGES FOR FY 2017:**

**Marine Operations and Maintenance: Alternative Crew Models (Base Funding: \$182,376,000 and 828 FTE; Program Change: +\$2,000,000 and 0 FTE):** NOAA requests an increase of \$2,000,000 and 0 FTE for a total of \$184,376,000 and 828 FTE to support a pilot program for alternative crewing on NOAA ships.

### **Proposed Actions:**

NOAA requests an increase to expand the rotational staffing program for licensed engineering officers on approximately twelve NOAA ships. OMAO will also begin piloting rotational staffing for unlicensed engine, deck, steward and survey departments on two ships. \$1.5 million of the requested funding will support the incremental staffing needed for implementation of the program, and \$500 thousand will support employee travel from the duty location to and from the location of the assigned vessel. Implementing the rotational staffing program will increase the number of DAS available for allocation when the Fleet Council works to prioritize the missions and allocate DAS.

In FY 2015, NOAA began testing two alternative staffing models for licensed engineers: the Blue/Gold pilot on the *Henry Bigelow* and the A/B/C pilot on the *Oscar Dyson*. The goal of these pilot programs was to allow consistent scheduled time-off, and reduce the attrition of NOAA's licensed Engineering Officers to 10 percent or less. Additionally, the alternate staffing models sought to reduce lost DAS due to staffing shortfalls, and to increase the quantity of preventive maintenance by utilizing fully staffed engineering departments.

From this testing, NOAA has elected to proceed with the A/B/C model. This model utilizes three rotational groups of six licensed engineers. At any given time, two engineers are off for 30 days, and then rotate on for 60 days, while two more come off for 30 days. The overlap on board helps with continuity of ongoing ship operations and maintenance. While ashore, the engineers are offered the opportunity to use earned leave, obtain job-related training, or elect to augment for engineers on other ships. This model was operationally successful, cost less and fit within Federal Employee leave regulations. The rotational model will continue on the *Oscar Dyson* in FY 2016. In FY 2017, these funds will support implementation on 12 ships, including the *Fairweather*, *Bell M. Shimada*, *Nancy Foster*, *Ferdinand Hassler*, and *Ronald H. Brown*.

### **Statement of Need and Economic Benefits:**

If a qualified replacement engineer is not available when another is unable to sail, it can result in lost Days at Sea (DAS). NOAA faces a maritime industry-wide problem of high demand for a small pool of qualified mariners. Intense competition for these professionals requires employers to offer very competitive salary and quality of life benefits in order to retain quality employees. One of the consistent concerns NOAA has heard from engineering staff during exit interviews is that, unlike industry, there is no guaranteed, schedulable, time-off for taking leave or obtaining job-related training. It is difficult to use accrued leave when the ship is scheduled to be at sea due to a shortage of substitute staff. It is also difficult for engineering staff to use accrued leave when the ship is in port because these are often high-tempo opportunities for engineering repairs.

### **Resource Assessment:**

Within current resources, OMAO estimates 3,330 days at sea and an 89 percent utilization rate. Additional resources are needed in order to minimize impact to operations as OMAO completes this pilot program.

**Schedule and Milestones:**

FY 2017:

- Rollout of the A/B/C model to a total of 12 of the 16 NOAA ships
- Pilot of rotational model for unlicensed engineers and deck, steward, and survey departments

**Deliverables:**

FY 2017:

- At the requested funding level, the program will provide approximately 3,375 OMAO-funded DAS in FY 2017 and 3,415 DAS from FY 2018 forward, for 16 active vessels, assuming a fuel rate of \$2.97 per gallon. Detailed deliverables are determined on a project-by-project basis as documented in sailing instructions agreed to by OMAO and the respective line office.

**Performance Goals and Measurement Data:**

<b>Performance Measure:</b> OMAO Funded Days at Sea with 16 active ships	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	3,375	3,415	3,415	3,415	3,415
<b>Without Increase</b>	2,546	2,799	3,330	3,330	3,330	3,330	3,330
<b>Description:</b> OMAO base-funded DAS in support of NOAA’s programs such as nautical charting, bathymetric mapping, fisheries stock assessments and research, ecosystem assessments, marine environmental baseline assessments, coastal-ocean circulation, and oceanographic and atmospheric research. For FY 2017 and forward, NOAA assumes a fuel rate of \$2.97 per gallon consistent with DLA standard fuel prices for FY 2016.							

<b>Performance Measure:</b> Fleet Utilization with 16 active ships	<b>FY 2015 Actual</b>	<b>FY 2016 Target</b>	<b>FY 2017 Target</b>	<b>FY 2018 Target</b>	<b>FY 2019 Target</b>	<b>FY 2020 Target</b>	<b>FY 2021 Target</b>
<b>With Increase</b>	N/A	N/A	90%	91%	91%	91%	91%
<b>Without Increase</b>	68%	74%	89%	89%	89%	89%	89%
<b>Description:</b> The Fleet Utilization Rate is calculated by taking the base-funded DAS and dividing it by the maximum operating tempo of 235 DAS per active ship. In FY 2017 and forward, NOAA assumes 16 active ships at a fuel rate of \$2.97 per gallon consistent with DLA standard fuel prices for FY 2016.							

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Office of Marine and Aviation Operations  
**Sub-program:** Marine Operations and Maintenance  
**Program Change:** Alternative Crewing Models

<b>Object Class</b>		<b>FY 2017 Increase</b>	<b>FY 2017 Total Program</b>
11	Personnel compensation		
11.1	Full-time permanent	0	35,084
11.3	Other than full-time permanent	1,180	50
11.5	Other personnel compensation	0	33,064
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	1,180	68,198
12	Civilian personnel benefits	320	17,524
13	Benefits for former personnel	0	20
21	Travel and transportation of persons	500	4,326
22	Transportation of things	0	1,864
23.1	Rental payments to GSA	0	992
23.2	Rental Payments to others	0	3,539
23.3	Communications, utilities and miscellaneous charges	0	5,024
24	Printing and reproduction	0	220
25.1	Advisory and assistance services	0	2,670
25.2	Other services	0	45,617
25.3	Purchases of goods & services from Gov't accounts	0	3,607
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	25,862
31	Equipment	0	1,433
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	3,480
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	2,000	184,376

**APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES**  
**SUB-PROGRAM: AVIATION OPERATIONS**

OMAO's Aircraft Operations Center (AOC), located at MacDill Air Force Base in Tampa, Florida, operates NOAA's Aircraft Fleet in support of NOAA's mission to promote global environmental assessment, prediction, and stewardship of the Earth's environment. The aircraft operate throughout the United States and around the world over open oceans, mountains, coastal wetlands, and the Arctic. AOC provides capable, mission-ready aircraft and professional crews to meet NOAA's scientific mission by assisting with global climate change and air quality studies, marine mammal population assessments, coastal erosion surveys, oil spill investigations, coastal mapping, flood prediction, and hurricane prediction modeling. AOC flight crews operate in some of the world's most demanding flight regimes, including flying into the eye of a hurricane.

The variety and versatility of NOAA's aircraft provide scientists with the airborne platforms necessary to collect essential environmental and geographic data. The fleet is equipped with comprehensive data collection systems that are capable of assessing the environment, coastal and marine resources, and severe weather. OMAO also ensures that contracted aviation operations are conducted safely by providing technical support, services, and equipment to NOAA programs.

In FY 2017, AOC plans to provide approximately 3,947 OMAO-funded flight hours in support of NOAA's mission. Additional flight hours also may be funded by programs as determined based on the availability of aircraft and funds during the year of budget execution.

The Aviation Operations sub-program:

- Provides NOAA with centralized aircraft systems management and coordination of airborne flight time;
- Works with the Fleet Council to develop annual flight time allocation schedules based on data collection requirements;
- Modifies, maintains, and operates aircraft with a workforce of specially-trained civilians and NOAA Corps officers to meet data collection requirements;
- Maintains the airworthiness and operating standards of aircraft for optimum safety along with standardization of scientific systems and aircraft;
- Operates aircraft safely and in compliance with Federal Aviation Administration regulations regarding use of airspace, control of air traffic, and aircraft registration;
- Develops and operates prototype and operational scientific-research instrumentation aboard NOAA aircraft; and
- Provides centralized expertise in aviation safety to arrange for safe commercial aviation services for NOAA programs using contracted aircraft.



NOAA's Aircraft Fleet detail for FY 2017, including information for the current program, is provided below:

Aircraft	Type	Mission	Location	Status
<b>HEAVY:</b> (2) Lockheed WP-3D	4-engine turbo prop	Air quality (OAR) Hurricane research (OAR) Hurricane reconnaissance (NWS) Ocean winds (NESDIS, NWS) Hurricane intensity forecasting (NWS) Climate research (OAR)	MacDill AFB, FL	N42: Active N43: Active
<b>MID:</b> (1) Gulfstream G-IV	2-engine turbo jet	Hurricane surveillance (NWS) Hurricane intensity forecasting (NWS) Atmospheric research (OAR)	MacDill AFB, FL	Active
<b>LIGHT:</b> (4) Dehavilland Twin Otter DHC-6	2-engine turbo prop	Aerial surveys (NMFS) Atmospheric research (OAR) Snow/Water Resources Surveys (NWS)	MacDill AFB, FL	N46: Active N48: Active N55: Active N57: Active
(1) King Air	2-engine turbo prop	Photogrammetry (NOS) Multi-spectral scanner (NOS) Airborne bathymetric LIDAR (NOS, NWS) Post-storm damage assessment (NOS)	MacDill AFB, FL	Active
(1) Jet Prop Commander AC/695	2-engine turbo prop	Fisheries observations (NMFS) Marine mammal observations (NMFS) Snow/Water Resources Surveys (NWS)	MacDill AFB, FL	Active

**Schedule and Milestones:**

Annual aircraft schedules and milestones are governed by the Aircraft Allocation Plan (<http://www.omaο.noaa.gov/airallocation.html>) as agreed to and signed by the NOAA Fleet Council. The Aircraft Allocation Plan details the objective and duration of individual NOAA projects.

**Deliverables:**

- In FY 2017 OMAO plans to provide 3,947 flight hours, which includes 3,355 mission hours to support NOAA’s highest priority requirements and 592 hours for training, maintenance flights, and calibration testing. Detailed deliverables are determined on a project-by-project basis as documented in flight instructions agreed to by OMAO and the supported Line Office.
- Perform Program-funded Hours as scheduled. In addition to the OMAO-funded flight hours, OMAO conducts missions funded through Service Level Agreements (SLA) with NOAA programs and reimbursable agreements with other agencies. Program- funded hours are scheduled based on availability of planes and program funds.

**Performance Goals and Measurement Data:**

Performance Measure:	FY 2015 Actual	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target	FY 2021 Target
OMAο funded Flight Hours	4,804	5,365	3,947	3,947	3,947	3,947	3,947

**Description:** Number of OMAO funded flight hours in support of NOAA’s programs such as global climate change and air quality studies, marine mammal population assessments, coastal erosion surveys, oil spill investigations, coastal mapping, flood prediction, and hurricane prediction modeling. OMAO funded hours include both mission and non-mission hours. Non-mission hours are for training, maintenance, and calibration flights. For 2016 and beyond, they are calculated at 15% of the total OMAO, program and reimbursable flight hours.

**PROGRAM CHANGES FOR FY 2017:**

No program changes are requested for this sub-program.

## **APPROPRIATION ACCOUNT: PROCUREMENT, ACQUISITION, AND CONSTRUCTION SUB-PROGRAM: FLEET REPLACEMENT PROGRAM**

The Fleet Replacement Program (FRP) develops requirements and acquisition strategies and monitors the modernization and construction of ships in order to meet NOAA's Days at Sea (DAS) in-situ observing requirements. FRP oversees government and contractual resources necessary to design, equip, construct, or modernize ships and ship-board systems. NOAA ships face challenges similar to other observational infrastructure, including expanded mission requirements, age and obsolescence, and finite resources for recapitalization. OMAO receives sustained funding for ongoing activities related to modernization and ship construction activities and contains two PPAs: Fleet Capital Improvements and Technology Infusion and New Vessel Construction.

The New Vessel Construction PPA funds proper oversight of ship construction activities including evaluation of requirements, reviewing proposals, and monitoring progress towards achieving goals.

In FY 2016, NOAA received \$80,050,000 in New Vessel Construction for one Research Survey Vessel (RSV). The RSV will be a multi-purpose survey vessel designed to operate in shallow coastal waters. It will allow NOAA to perform operations and maintain expertise in such critical mission areas as hydrography, fisheries sampling and acoustics, and ocean sensing and monitoring.

NOAA's fleet is aging, with half 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 RSV 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 a lower acquisition and operations and maintenance costs than the OSV. Investment in an OSV has been shifted to a later date.

Broadly, the RSV will support fishery surveys critical to species management, habitat and hydrographic surveys, and disaster response. Specific RSV design and capabilities will be optimally designed based on NOAA prioritized at-sea data collection requirements and regionally-driven specifications. The RSV will have the capabilities to fulfill the mission requirements of the ships scheduled first for retirement, NOAA ships Oregon II and Oscar Elton Sette. The exact succession of ship replacements will be determined based on a number of factors including ship material condition, prioritized requirements and fleet recapitalization timelines.

Fleet Capital Improvements and Technology Infusion is designed to maintain and extend the service life of the ship fleet by ensuring required upgrades to ship-board systems and mission equipment are in line with the needs of the programs and safety requirements. OMAO monitors the material condition of the ships using a Ship Structure and Machinery Evaluation (SSME), which captures the ship's condition. The SSME documents the results of

inspections and identifies future work requirements, which will guide future capital investment decision making. At the same time, OMAO uses manufacturer-provided information for new ships to develop maintenance profiles. As information is gathered through these means, the investment decision model will be continually updated.

In FY 2014, NOAA implemented the Progressive Lifecycle Maintenance program to improve the material condition of the NOAA ship fleet by stabilizing capital investment. This allows OMAO to plan and perform cyclic depot-level capital investments across the fleet each year. During the maintenance cycle, ships receive regular upgrades and replacements of mission support equipment and technology infusions such as data processing capacity. The result is a fleet maintained at a higher state of readiness; extension of ship service life; and avoidance of mechanical, structural, and mission equipment obsolescence.

Per appropriations language in the 2016 appropriations bill, NOAA is updating its fleet recapitalization plan and consulting with other Federal oceanographic agencies to ensure its proposed fleet investments are appropriately prioritized and coordinated.

Funding addresses the following objectives:

- to ensure the proper maintenance and safety of NOAA ships within American Bureau of Shipping, U.S. Coast Guard, Environmental Protection Agency, and applicable international requirements
- to ensure proper oversight of the design and construction of new ships that meet all applicable Federal regulations

**Schedule and Milestones:**

FY 2017-2021 – Conduct progressive lifecycle maintenance.

**Deliverables:**

Cyclic capital investments in the NOAA fleet to improve material condition, prolong service life, and ensure continuity of ship mission availability and readiness.

## **PROGRAM CHANGES FOR FY 2017:**

**New Vessel Construction: Fleet Recapitalization (Base Funding: \$80,050,000 and 5 FTE; Program Change: -\$56,050,000 and 0 FTE):** NOAA requests a decrease of \$56,050,000 and 0 FTE for a total of \$24,000,000 and 0 FTE to complete the construction of one Regional Survey Vessel (RSV) as part of a multi-year NOAA ship fleet recapitalization initiative.

### **Proposed Actions:**

NOAA's request of \$24 million will supplement the FY 2016 funding of \$80 million to allow NOAA to complete design, acquisition and construction of one RSV. This action will contribute to the NOAA priority of strengthening observational infrastructure by retaining current mission capacity and expertise while positioning the NOAA Fleet for long-term, sustainable support of NOAA Line Office scientific missions through at-sea data collection and in situ observations. The request will continue to build upon activities funded in FY 2016 for a regional class ship.

The request is allocated to the following actions:

### **Program Management and Development:**

This work includes budget and schedule development and execution, progress tracking based on ship construction progression milestones, logistics planning, change management, requirements and design development, and source selection planning and execution. It is integral to the project management to have employees on-site for the multiple phase acquisition.

### **Ship Construction:**

The program costs cover the detailed design and construction. Ship construction includes: the engineering to develop the detailed construction drawings; the basic ship construction costs including the hull, machinery, electronics, and mission systems; and required tests and trials to deliver a fully-integrated ship.

### **Statement of Need and Economic Benefits:**

Despite the steady advancement of sampling and remote sensing technologies, ships will remain fundamental for at-sea data collection for the foreseeable future. NOAA ships are the only NOAA observational platforms that meet the agency's unique at-sea data collection requirements, such as mapping the ocean floor to update nautical charts, surveying marine mammal and fish populations, and servicing NWS' weather buoys. NOAA ships serve as a sampling system and provide researchers and technologists the ability to collect data at required locations for extended periods of time. This data is critical to produce national products and services that directly support the U.S. economy, including nautical charts, commercial fishery quotas and weather forecasts.

The RSV will be a multi-purpose survey vessel capable of operating in shallow coastal waters. It will allow NOAA to continue current operations and maintain expertise in critical mission areas including hydrography, fisheries sampling and acoustics, and ocean sensing and monitoring.

Technological improvements in the next five to ten years are expected to increase data gathering capabilities, allowing expanded simultaneous multi-mission operations on such newer vessels. New ship construction will incorporate advancements in green technology, improving energy efficiency and reducing environmental impacts, as compared to older vessels. Since 2007, the NOAA fleet has declined from 19 ships, to the current fleet of 16 ships. The fleet is projected to decline by 50 percent over the next 10-12 years, with the risk of catastrophic

failures increasing as ship service life is extended. Loss of ships will limit NOAA's ability to meet at-sea prioritized requirements.

Broadly, the RSV will support fishery surveys critical to species management, habitat and hydrographic surveys, and disaster response. Specific RSV design and capabilities will be optimally designed based on NOAA prioritized at-sea data collection requirements and regionally-driven specifications. The RSV will have the capabilities to fulfill the mission requirements of the ships scheduled first for retirement, NOAA ships *Oregon II* and *Oscar Elton Sette*. The exact succession of ship replacements will be determined based on a number of factors including ship material condition, prioritized requirements and fleet recapitalization timelines.

**Resource Assessment:**

The FY 2016 Enacted Budget included \$80 million to initiate the detail design and construction phase of the RSV.

**Schedule and Milestones/Deliverables:**

In FY 2016 and FY 2017, NOAA will use funds to identify RSV requirements, conduct trade off studies and analysis of alternatives, and begin the conceptual design work. This work will also include development of the Rough Order of Magnitude (ROM) estimate of resources and costs required.

NOAA must follow the DOC instituted Scalable Acquisition Project Management Framework in conducting cost effective and efficient acquisitions. It provides a set of decisions and processes that must occur in order to properly synchronize requirements, resources, and procurement to deliver required capabilities, and helps to develop realistic program cost and schedule estimates

**Outyear Funding Estimates - RSV (\$ in thousands):**

Until OMAO works through DOC's Scalable Acquisition Project Management process, an accurate construction cost profile cannot be produced.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**  
**(Dollar amounts in thousands)**

**Budget Program:** Office of Marine and Aviation Operations  
**Sub-program:** OMAO Fleet Replacement  
**Program Change:** Fleet Recapitalization

<b>Object Class</b>	<b>FY 2017 Decrease</b>	<b>FY 2017 Total Program</b>
11 Personnel compensation		
11.1 Full-time permanent	0	351
11.3 Other than full-time permanent	0	0
11.5 Other personnel compensation	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	351
12 Civilian personnel benefits	0	95
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	0
22 Transportation of things	0	0
23.1 Rental payments to GSA	0	0
23.2 Rental Payments to others	0	0
23.3 Communications, utilities and miscellaneous charges	0	0
24 Printing and reproduction	0	0
25.1 Advisory and assistance services	0	0
25.2 Other services	(56,050)	23,554
25.3 Purchases of goods & services from Gov't accounts	0	0
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	0
31 Equipment	0	0
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	0
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	(56,050)	24,000

**Fleet Capital Improvements and Technology Infusion: Progressive Lifecycle Maintenance Program (Base Funding: \$11,700,000 and 1 FTE: Program Change: +\$5,000,000 and 0 FTE):**

NOAA requests an increase of \$5,000,000 and 0 FTE for a total of \$16,700,000 and 1 FTE to increase funding available for capital repairs to NOAA’s ship fleet under the Progressive Lifecycle Maintenance.

**Proposed Actions:**

Progressive lifecycle maintenance is a stabilized capital investment that establishes the capacity to maximize service life of the fleet. It addresses needed repairs that improve the material condition of the ships, and provides sustained critical technology refresh. Progressive maintenance ensures NOAA ships remain capable of collecting environmental data to support NOAA’s mission to provide accurate and reliable information to the public.

With additional maintenance funding in FY 2017, NOAA will begin the planned replacement of unsupported navigational equipment, propulsion control, drive systems and crane and ship control systems. NOAA will also upgrade galley spaces and equipment, critical interior communication systems, and air conditioning and refrigeration systems. Discharge systems will also be brought into compliance with current regulation, which has changed since many of the ships were constructed.

The progressive lifecycle maintenance model emulates established benchmarks and best practices from sectors as diverse as the aviation industry and the U.S. Coast Guard Surface Forces Logistics Centers. The approach for ship capital investment in the Progressive Lifecycle Maintenance program rotates the type and intensity of capital investment throughout the Fleet, providing balance year-over-year, and more reliability over time. This action will contribute to the NOAA priority of achieving organizational excellence by reducing risk and uncertainty in capital investment, and ensuring mission function continuity and availability.

The chart below lists the types of capital investments that will vary from year-to-year based on the results of Ship Structure and Machinery Evaluations (SSMEs) that assess the material condition of the ships and determine priority repairs.

Crew Space Refurbishment	Science/ Mission Space Refurbishment	Shipboard Systems	Underwater Body	Mission Systems Refresh
<ul style="list-style-type: none"> <li>• Refrigeration systems</li> <li>• HVAC refurbishment</li> <li>• Environmental equipment replace</li> </ul>	<ul style="list-style-type: none"> <li>• Space renovation</li> <li>• Government furnished equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Propulsion &amp; generation systems overhaul</li> <li>• Re-piping</li> <li>• Fire suppression upgrades</li> <li>• Machinery monitoring upgrades</li> </ul>	<ul style="list-style-type: none"> <li>• Blast hull</li> <li>• Refurbish props/shafts</li> <li>• Refurbish valves/ piping</li> </ul>	<ul style="list-style-type: none"> <li>• Multi-beam sonars and sensors</li> <li>• Ship-board electronic data processing and storage</li> <li>• UAS Launch/ Recovery System</li> <li>• Small boats and launches</li> <li>• Cranes, winches, davits</li> </ul>



**Statement of Need and Economic Benefits:**

NOAA ship costs increase dramatically as systems age in the harsh marine environment. The ability to support machinery and equipment also becomes difficult as manufacturers move to new technologies. Support for older machinery and equipment has been the greatest challenge in recent years, particularly with the introduction of new control technologies and added environmental requirements. Corrosion and machinery support issues have occurred sooner than the 20 to 25 years of expected service life. Additional progressive lifecycle maintenance funds will allow OMAO to address these issues, achieve service life extension, reduce the need for substantial structural repairs, and reduce unplanned maintenance. The funds will also allow for an assessment of available technologies required to maintain ship machinery and equipment for the second twenty years of a ship's service life.

**Resource Assessment:**

A proactive maintenance program is significantly less costly than reactive repairs. Capital investments for ships can range from \$7 million to \$15 million annually, varying from year-to-year based on the ships and the results of SSMEs. The additional funding will continue to address the accumulation of needed repairs and help achieve service life extension of the ships. In FY 2015, NOAA's deferred maintenance back log was approximately \$27 million, an increase of about 17 percent from FY 2014, when it was about \$23 million. Funds provided for progressive maintenance will reduce this backlog by proactively maintaining vessels before systems fail.

**Schedule and Milestones:**

FY 2017-2021 – Conduct progressive lifecycle maintenance.

**Deliverables:**

Cyclic capital investments in the NOAA Fleet to improve material condition, prolong service life, and ensure continuity of ship mission availability and readiness.

**Performance Goals and Measurement Data:**

**Out-year Funding Estimates (\$ in thousands):**

<b>Progressive Lifecycle Maintenance</b>	<b>FY 2016 &amp; Prior</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>Total</b>
<b>Change from FY 2017 Base</b>		5,000	5,000	5,000	5,000	5,000	Recurring
<b>Total Request</b>	22,892	16,700	16,700	16,700	16,700	16,700	Recurring

**MANDATORY APPROPRIATIONS ACCOUNT: PROCUREMENT, ACQUISITION, AND CONSTRUCTION**

**SUB-PROGRAM: RECAPITALIZED RESEARCH FLEET**

In addition to the aforementioned \$24 million request in discretionary funds for OMAO, the Budget includes \$100 million in mandatory funds to begin construction on a second Regional Survey vessel (RSV) as part of a multi-year NOAA ship fleet recapitalization initiative. This action will contribute to the NOAA priority of strengthening observational infrastructure by retaining current mission capacity and expertise while positioning the NOAA Fleet for long-term, sustainable support of NOAA Line Office scientific missions through at-sea data collection and in situ observations.

NOAA’s fleet is aging, with half 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. Additionally, the risk of catastrophic failures increases as ship service life is extended. Loss of ships will limit NOAA’s ability to meet at-sea prioritized requirements.

Despite the steady advancement of sampling and remote sensing technologies, ships will remain fundamental for at-sea data collection for the foreseeable future. NOAA ships are the only NOAA observational platforms that meet the agency’s unique at-sea data collection requirements, such as mapping the ocean floor to update nautical charts, surveying marine mammal and fish populations, and servicing NWS’ weather buoys. NOAA ships serve as a sampling system and provide researchers and technologists the ability to collect data at required locations for extended periods of time. This data is critical to produce national products and services, including nautical charts, commercial fishery quotas and weather forecasts that directly support the U.S. economy.

The RSV will be a multi-use platform designed to conduct a range of surveys throughout the U.S. Exclusive Economic Zone (EEZ). The vessel design will be determined by regional and observation requirements and may include capabilities to collect data critical to NOAA’s missions including fisheries surveys, hydrographic surveys, disaster response and weather buoy servicing. Specific RSV capabilities will be optimally designed based on NOAA prioritized at-sea data collection requirements and regionally-driven specifications. The RSV will have the capabilities to fulfill the mission requirements of the ships scheduled first for retirement, NOAA ships Oregon II and Oscar Elton Sette. The exact succession of ship replacements will be determined based on a number of factors including ship material condition, prioritized requirements and fleet recapitalization timelines.

**Funding Estimates (\$ in millions):**

<b>OMAO Fleet Replacement Description</b>	<b>FY 2016 Enacted</b>	<b>FY 2017 PB</b>	<b>FY 2017 Mandatory</b>	<b>Additional OMAO Fleet Replacement Requirements</b>
Regional Survey Vessel (RSV) One	\$80	\$24	\$0	\$TBD
Regional Survey Vessel (RSV) Two	\$0	\$0	\$100	\$TBD
<b>Total</b>	<b>\$80</b>	<b>\$24</b>	<b>\$100</b>	<b>\$TBD</b>

## **APPROPRIATION ACCOUNT: NOAA Corps Retirement Pay (Mandatory)**

The retirement system for the uniformed services provides a measure of financial security after release from active duty for service members and their survivors. It is an important factor in the choice of a career in the uniformed services, and the legal mandate for rates to be paid is the same for all uniformed services, see 10 USC. Retired pay is an entitlement to NOAA Commissioned Corps officers under 33 USCA 3044, 33 USCA 3045, and 33 USCA 3046. Retired pay funds are transferred to the U.S. Coast Guard (USCG), which handles the payments each year as adjusted pursuant to the Department of Defense Authorization legislation. Healthcare funds for non-Medicare-eligible retirees, dependents, and annuitants are administered by the Office of Marine and Aviation Operations (OMAO).

Legal authority for retirement of NOAA Commissioned Corps officers is contained in 33 USCA 3044. Retired officers of the NOAA Commissioned Corps receive retirement benefits that are administered by USCG, in accordance with a Memorandum of Agreement between the USCG and NOAA, with funds certified by the Commissioned Personnel Center within OMAO. This amount increased from approximately \$28.3 million in FY 2015 to \$29.4 in NOAA's FY 2016 and FY 2017 budget as both years will have 13 pay periods.

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**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 NOAA Corps Retirement Pay (Mandatory)  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2016 Currently Available	0	0	29,375	29,375
plus: 2017 Adjustments to Base	0	0	0	0
<b>FY 2017 Base</b>	<b>0</b>	<b>0</b>	<b>29,375</b>	<b>29,375</b>
plus 2017 Program Changes	0	0	0	0
<b>FY 2017 Estimate</b>	<b>0</b>	<b>0</b>	<b>29,375</b>	<b>29,375</b>

		FY 2015		FY 2016		FY 2017		FY 2017		Increase/ Decrease	
		Actual		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount		
NOAA Corps	Pos/BA	0	28,269	0	29,375	0	29,375	0	29,375	0	0
Retirement Pay	FTE/OBL	0	26,570	0	29,375	0	29,375	0	29,375	0	0
<b>Total: NOAA Corps</b>	Pos/BA	<b>0</b>	<b>28,269</b>	<b>0</b>	<b>29,375</b>	<b>0</b>	<b>29,375</b>	<b>0</b>	<b>29,375</b>	<b>0</b>	<b>0</b>
Retirement Pay	FTE/OBL	0	26,570	0	29,375	0	29,375	0	29,375	0	0

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
NOAA Corps Retirement Pay (Mandatory)  
**SUMMARY OF RESOURCE REQUIREMENTS**  
(Dollar amounts in thousands)

	FY 2015		FY2016		FY 2017		FY 2017		Increase/ (Decrease)	
	Actual		Currently Available		Base		Estimate			
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	26,570	0	29,375	0	29,375	0	29,375	0	0
<b>Total Obligations</b>	<b>0</b>	<b>26,570</b>	<b>0</b>	<b>29,375</b>	<b>0</b>	<b>29,375</b>	<b>0</b>	<b>29,375</b>	<b>0</b>	<b>0</b>
<b>Adjustments to Obligations:</b>										
Unobligated balance	0	1,699	0	0	0	0	0	0	0	0
<b>Total Budget Authority</b>	<b>0</b>	<b>28,269</b>	<b>0</b>	<b>29,375</b>	<b>0</b>	<b>29,375</b>	<b>0</b>	<b>29,375</b>	<b>0</b>	<b>0</b>
<b>Financing from Transfers and Other:</b>										
<b>Net Appropriation</b>	<b>0</b>	<b>28,269</b>	<b>0</b>	<b>29,375</b>	<b>0</b>	<b>29,375</b>	<b>0</b>	<b>29,375</b>	<b>0</b>	<b>0</b>

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 NOAA Corps Retirement Pay (Mandatory)  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
 (Dollar amounts in thousands)

<b>Object Class</b>	FY 2015 Actual	FY 2016 Currently Available	FY 2017 Base	FY 2017 Estimate	Increase (Decrease)
Other purchases of goods and services from Gov't accounts	26,570	29,375	29,375	29,375	0
<b>Total Obligations</b>	<b>26,570</b>	<b>29,375</b>	<b>29,375</b>	<b>29,375</b>	<b>0</b>
Less prior year recoveries	0	0	0	0	0
Less unobligated balance, SOY	0	0	0	0	0
Plus unobligated balance, EOY	1,699	0	0	0	0
Offsetting collections, Mandatory	0	0	0	0	0
Less: Previously Unavail. Unoblig. Bal.	0	0	0	0	0
<b>Total Budget Authority Mandatory</b>	<b>28,269</b>	<b>29,375</b>	<b>29,375</b>	<b>29,375</b>	<b>0</b>

**APPROPRIATION ACCOUNT: Medicare-Eligible Retiree Healthcare Fund Contribution - NOAA Corps**

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. For FY 2017, payments to the accrual fund are estimated at \$1,936,000.



**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Medicare Eligible Retiree Health Fund Contribution – NOAA Corps  
**SUMMARY OF RESOURCE REQUIREMENTS**  
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2016 Currently Available	0	0	1,936	1,936
plus: 2017 Adjustments to Base	0	0	0	0
<b>FY 2017 Base</b>	<b>0</b>	<b>0</b>	<b>1,936</b>	<b>1,936</b>
plus 2017 Program Changes	0	0	0	0
<b>FY 2017 Estimate</b>	<b>0</b>	<b>0</b>	<b>1,936</b>	<b>1,936</b>

		FY 2015		FY 2016		FY 2017		FY 2017		Increase/ Decrease	
		Actual		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount		
Medicare Eligible	Pos/BA	0	1,936	0	1,936	0	1,936	0	1,936	0	0
Health Fund Contribution	FTE/OBL	0	1,336	0	1,936	0	1,936	0	1,936	0	0
NOAA Corps											
Total: Medicare Eligible	Pos/BA	0	1,936	0	1,936	0	1,936	0	1,936	0	0
Retiree Health Fund	FTE/OBL	0	1,336	0	1,936	0	1,936	0	1,936	0	0

**Department of Commerce**  
National Oceanic and Atmospheric Administration  
Medicare Retiree Health Fund Contribution – NOAA Corps  
**SUMMARY OF RESOURCE REQUIREMENTS**  
(Dollar amounts in thousands)

Exhibit 5

	FY 2015		FY2016		FY 2017		FY 2017		Increase/ (Decrease)	
	Actual		Currently Available		Base		Estimate			
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	1,336	0	1,936	0	1,936	0	1,936	0	0
<b>Total Obligations</b>	<b>0</b>	<b>1,336</b>	<b>0</b>	<b>1,936</b>	<b>0</b>	<b>1,936</b>	<b>0</b>	<b>1,936</b>	<b>0</b>	<b>0</b>
<b>Adjustments to Obligations:</b>										
Unobligated balance	0	600	0	0	0	0	0	0	0	0
<b>Total Budget Authority</b>	<b>0</b>	<b>1,936</b>	<b>0</b>	<b>1,936</b>	<b>0</b>	<b>1,936</b>	<b>0</b>	<b>1,936</b>	<b>0</b>	<b>0</b>
<b>Financing from Transfers and Other:</b>										
<b>Net Appropriation</b>	<b>0</b>	<b>1,936</b>	<b>0</b>	<b>1,936</b>	<b>0</b>	<b>1,936</b>	<b>0</b>	<b>1,936</b>	<b>0</b>	<b>0</b>

**Department of Commerce**  
 National Oceanic and Atmospheric Administration  
 Medicare Eligible Retiree Health Fund Contribution – NOAA Corps  
**SUMMARY OF REQUIREMENTS BY OBJECT CLASS**  
 (Dollar amounts in thousands)

	FY 2015 Actual	FY 2016 Currently Available	FY 2017 Base	FY 2017 Estimate	Increase (Decrease)
<b>Object Class</b>					
Other purchases of goods and services from Gov't accounts	1,336	1,936	1,936	1,936	0
<b>Total Obligations</b>	1,336	1,936	1,936	1,936	0
Less prior year recoveries	0	0	0	0	0
Less unobligated balance, SOY	0	0	0	0	0
Plus unobligated balance, EOY	600	0	0	0	0
Offsetting collections, Mandatory	0	0	0	0	0
Less: Previously Unavail. Unoblig. Bal.	0	0	0	0	0
<b>Total Budget Authority Mandatory</b>	1,936	1,936	1,936	1,936	0
<b>Personnel Data</b>					
Full-Time Equivalent Employment					
Full-time permanent	0	0	0	0	0
Other than full-time permanent	0	0	0	0	0
<b>Total</b>	0	0	0	0	0
Authorized Positions:					
Full-time permanent	0	0	0	0	0
Other than full-time permanent	0	0	0	0	0
<b>Total</b>	0	0	0	0	0

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