WRITTEN STATEMENT OF
KATHRYN SULLIVAN, PH.D.
UNDER SECRETARY OF COMMERCE FOR OCEANS AND ATMOSPHERE
AND NOAA ADMINISTRATOR
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

ON THE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION'S
FY 2017 BUDGET REQUEST

BEFORE THE
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
SUBCOMMITTEE ON COAST GUARD AND MARITIME TRANSPORTATION
U.S. HOUSE OF REPRESENTATIVES

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Chairman Hunter, Ranking Member Garamendi, and members of the Subcommittee, thank you for this opportunity to submit this written statement for the record about the Administration's Fiscal Year 2017 (FY17) Budget Request for the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA). The priorities included in the FY17 Budget request build upon the important investments you enacted in FY16, and I am grateful for your support.

I believe that NOAA is one of the most valuable service agencies in the U.S. government. Through our network of observations, forecasts, and assessments, we strive to provide the foresight and information people need to live well and safely on this dynamic planet. At NOAA, we call this information "environmental intelligence," and producing it is at the core of our mission. From the surface of the sun to the depths of the ocean floor, we're keeping our finger on the pulse of our changing planet. We provide timely, reliable, and actionable information – based on sound science – that citizens, communities and businesses rely on to safeguard lives and property, prepare for extreme weather events, adapt to a changing world, ensure environmental sustainability, and enhance economic prosperity.

The $5.9 billion FY17 budget request is a $77 million increase over the FY 2016 enacted level and focuses on supporting our core missions, including deploying the next generation of weather satellites and observational infrastructure; fostering healthy marine resources; strengthening the

resiliency of our communities to adapt to a changing planet; improving forecasting accuracy and lead times for severe weather; and achieving organizational excellence by providing robust mission support services.

We've seen demand for our products and services increase as decision makers look for tools to help them better understand risk and prepare for the future. NOAA forecasts help communities prepare and respond to weather events, including the severe storms that swept through Texas last year, tornado events across the mid-west and Florida, and the recent winter storm that struck the Northeast. NOAA is also constantly improving its longer range forecasts for drought, coastal inundation and sea level rise, and seasonal events including El Ninos and La Ninas.

But the greater demand for our services goes beyond just extreme weather. The marine transportation system must accommodate a growing volume of commerce at our ports. NOAA provides the positioning data, tide and currents information, and nautical charts that ensure safe navigation and keep commerce flowing. Furthermore, changes in marine ecosystems due to climate and other stressors are increasing the need for more advanced scientific assessments to sustain economically viable commercial and recreational fisheries and to ensure that threatened and endangered species are protected.

The NOAA FY 2017 budget request aims not only to enhance public safety and community resilience, but also to make smart investments via innovative science and research to better position this country, its services, and its citizens for the future. As the agency positions itself to meet the growing demand from communities and businesses to help them prepare for, respond to, and overcome vulnerabilities and risk, we have carefully crafted a budget that continues efforts to strike a balance among our mission areas and between our internal and extramural programs, while maintaining strong fiscal discipline.

Below we highlight some of our top accomplishments, many of which we could not have achieved without strong support from Congress and our partners in the research, corporate, and conservation communities.

Launched Deep Space Climate Observatory Satellite (DSCOVR)

On February 11, 2015, we successfully launched DSCOVR from Cape Canaveral, Florida. DSCOVR, the United States' first operational deep space satellite, is a vital piece of our international space weather observing system. DSCOVR provides NOAA's Space Weather Prediction Center forecasters high-quality measurements of solar wind conditions, improving their ability to monitor and warn of potentially dangerous geomagnetic storms. Early warnings are crucial because solar storms can disrupt public infrastructure, such as transportation systems, power grids, telecommunications, and Geographic Positioning Systems (GPS). Early geomagnetic storm warnings allow infrastructure managers from the commercial airline, electric

power, and GPS industries to take appropriate mitigation actions. DSCOVR reached final orbit at Lagrange point 1, a gravity neutral point a million miles away from Earth, on June 8, 2015, and is now hovering continuously between the sun and Earth.

Launched the Jason-3 Satellite

On January 17, 2016, teams from NOAA, NASA, the Centre national d'etudes spatiales (CNES, the French Space Agency), the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), and SpaceX launched the Jason-3 satellite continuing a 20-year legacy of measuring changes to our world's oceans. From its near-polar orbit 1380 km above the earth, this observational platform will continue a record of ocean surface topography measurements. This sea level data is important for scientists to observe global sea level rise, help understand the strength of tropical cyclones, forecast tides and currents for commercial shipping, inform response efforts for oil spills and harmful algal blooms, and support El Nino and La Nina research and forecasting.

Continued Progress on Ending Overfishing and Rebuilding Fish Stocks

NOAA's *Status of Stocks 2014: Annual Report to Congress on the Status of U.S. Fisheries*, released in April 2015, reports that the number of fish stocks subject to overfishing or overfished has declined to an all-time low. As a result of the combined efforts of NOAA; the regional fishery management councils; and our partners in industry, research, and conservation communities; stocks subject to overfishing are down from 17 to 8 percent and overfished stocks are down from 24 to 16 percent since 2007. The report notes that three stocks, Gulf of Mexico gag grouper, golden tilefish, and butterfish, have been rebuilt to target levels. Two additional stocks, canary rockfish and petrale sole, have been rebuilt since the report was released, bringing the total to 39 stocks rebuilt since 2000 and allowing additional fishing opportunity in those fisheries. Gulf of Mexico red snapper continues to rebuild, enabling a 30 percent increase in the allowable catch for red snapper in 2015.

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

NOAA led a collaborative effort among four Federal agencies and the five Gulf of Mexico states (Trustees) to advance the *Deepwater Horizon* oil spill case – the largest marine oil spill in U.S. history – to reach a groundbreaking proposed settlement between British Petroleum (BP) and the Trustees that will promote widespread restoration in the affected region. NOAA provided extensive science and research (assessing the fish, wildlife, and habitat affected by the spill), supported the litigation actions against BP and other responsible parties, and led development of a comprehensive damage assessment and restoration plan that will direct $8.8 billion for ecosystem restoration in the Gulf of Mexico in the coming years. This funding will support significant long-term restoration for natural resources injured by the oil spill, including sea turtles, marine mammals, fish, deep sea corals, oysters, and coastal habitats and will provide

lasting and significant benefits to the people and environment of the Gulf of Mexico who were most directly impacted by this tragic event.

Increased Supercomputing Capacity for Improved Data Assimilation and Forecasts
NOAA began a major upgrade of its large scale operational supercomputers to allow for greater data assimilation and faster computation of model data. The supercomputing upgrade will help forecasters more accurately predict droughts, floods, winter storms, severe thunderstorms, and hurricanes. It will also enhance our water science and services for better forecasts of water flow, soil moisture, evapotranspiration, runoff, and other parameters for 2.7 million stream reaches in the continental U.S. This upgrade has already increased NOAA's supercomputing capacity by nearly four times the previous level, for a total of 5.8 petaflops.

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

Released Climate Resilience Toolkit
In November 2014, NOAA released version 1.0 of the web-based U.S. Climate Resilience Toolkit, which helps the Nation address challenges related to coastal flooding and other climate-related risks. The Toolkit responds to the President's State, Local and Tribal Leaders Task Force on Climate Preparedness and Resilience's requests for the Federal Government to provide useful, actionable climate information and tools to assist communities in planning for future climate conditions. For instance, the Toolkit includes map generators to illustrate climate-related vulnerabilities that communities face on national and local scales, and summarizes steps communities can take to become more resilient to climate change, such as managing water supply or strengthening infrastructure. The Climate Resilience Toolkit was developed in accordance with the President's Climate Action Plan and is available online at https://toolkit.climate.gov.

Completed Hydrographic and Environmental Surveys in the Arctic

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

Upgraded Hurricane Weather Research and Forecasting Model

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

Released Upgraded nowCOAST Tool

NOAA released a major upgrade of nowCOAST in September 2015. The GIS web-based mapping portal provides near real-time coastal intelligence for coastal and marine users on present and future weather, oceanographic, and hydrologic conditions. This upgrade ensures availability of nowCOAST's map viewer and map services 24 hours a day, 7 days a week for emergency management, homeland security, search and rescue, HAZMAT response, and marine operations. The new version features an improved map viewer that enables animations of changing conditions and the use of different base maps. The tool now integrates the latest National Weather Service watches, warnings, and advisories for long-duration hazards; water vapor imagery from NOAA geostationary satellites (GOES); forecast guidance from NOAA operational oceanographic forecast modeling systems; and satellite data on lightning activity.

Initiated an 'Early Warning System' for Freshwater Toxic Algal Blooms

In 2015, NOAA joined forces with NASA, the U.S. Environmental Protection Agency, and U.S. Geological Survey to transform satellite data designed to probe ocean biology into information that will help protect the American public from harmful freshwater algal blooms. The annual cost of U.S. freshwater degraded by harmful algal blooms is estimated to be $64 million in additional drinking water treatment, loss of recreational water usage, and decline in waterfront real estate values. In August 2014, local officials in Toledo, Ohio, banned the use of drinking water supplied to more than 400,000 residents after it had been contaminated by an algal bloom in Lake Erie. This inter-agency effort is designed to be an early warning system for toxic and nuisance algal blooms in freshwater systems by using satellites that can gather color data from

freshwater bodies during scans of the Earth. Based on this information, state and local agencies can provide the public with public health advisories. In addition, the project will improve the understanding of the environmental causes and health effects of these cyanobacteria and phytoplankton blooms in the United States.

FY 2017 BUDGET REQUEST

As noted above, NOAA's FY 2017 discretionary budget request of $5.9 billion further strengthens our efforts to put critical information into the hands of the public. This budget, an increase of $77 million or 1.3 percent over the FY 2016 enacted level, invests across NOAA's diverse portfolio in a number of initiatives that promote the Department's and the Administration's highest priorities, including: 1) enhancing community and economic resilience; 2) investing in mission-critical observational infrastructure; 3) evolving the National Weather Service; and 4) achieving organizational excellence.

1. Supporting Resilient Communities and Economies

Communities around the country are becoming more vulnerable to natural disasters and long-term adverse environmental changes. 2015 was the warmest year on record and saw 10 weather and climate disaster events, including flooding, coastal inundation, and drought, with losses each exceeding $1 billion across the U.S. These events devastated communities while impacting national agricultural, manufacturing, and energy production. At the heart of many of these environmental threats is water—either there is too much, not enough, or it is of poor quality. This is heightening the demand for more integrated water intelligence and prediction capabilities to inform decision-making at all levels about how best to keep communities safe, resilient, and prosperous.

NOAA is uniquely positioned to bring new insights to the water challenges facing our Nation. In FY 2017, we request $12.25 million to establish the Integrated Water Prediction effort to deliver a suite of water intelligence products to help communities and industries make better-informed decisions about how to prepare for and respond to extreme water events. At the heart of this initiative is an enhanced river flooding forecasting system that will increase the number of prediction points from about 4,000 to nearly 2.7 million nation-wide - providing river and stream forecasts at the neighborhood level and bringing flood and stream forecast to 100 million Americans who do not receive one today. This information will better equip communities and emergency managers to prepare for flooding events and to direct resources where they are most needed.

A large part of this work would happen at the National Water Center in Tuscaloosa, AL. This interagency facility researches, develops, and delivers state-of-the-science national hydrologic analyses, forecast information, data, decision-support services, and guidance to support and

inform essential emergency services and water management decisions. The Center currently has 46 staff members in residence from NOAA, USGS, academia, and other partners.
The Integrated Water Prediction initiative will set the stage for future efforts that draw on NOAA's broad expertise to improve our drought forecasts and to better integrate our models on coastal flooding with inland flooding. This effort will provide new information that emergency managers, farmers, water systems, the energy sector, and individuals can use to plan on scales ranging from of days to seasons. It will also allow them to maximize economic opportunity and protect lives and property.

In addition to NOAA's Integrated Water Prediction initiative, we have several other important resiliency initiatives. NOAA is requesting $10 million for the National Ocean and Coastal Security Fund, to help coastal states and other entities better understand and utilize the oceans, coasts, and Great Lakes of the U.S. More specifically, we will partner with the National Fish and Wildlife Foundation to award grants that enhance ecological, economic, social, and recreational benefits of coastal resources. The FY 2017 budget also consolidates the NOAA Fisheries' Coastal Ecosystem Resiliency Grants program into the National Ocean Service's Regional Coastal Resilience Grants program, which will fill a gap for regional-scale, collaborative resilience actions that are funded competitively. The combined program requests a net $5 million increase and will emphasize functional linkages between healthy ecosystems and natural infrastructure for community resilience. Coastal communities have made clear their need for this type of assistance; last year, NOAA received 196 applications totaling over $151 million for both programs. With the $15 million that was available, we were able to leverage over $4 million in matching funds. Clearly, there is a huge demand for this type of funding – and federal investments bring other resources to the table.

In the past few years NOAA has taken a number of significant steps to promote sustainable fisheries and fishing practices worldwide, including the release of the Sustainable Seafood Traceability proposed rule. This rule will improve the ability of the United States to keep illegally harvested seafood out of our markets, reduce seafood fraud, continue to create a more level playing field for U.S. fishermen and will discourage unsustainable and unsafe fishing practices abroad. However, additional funds are needed to ensure that we can enforce these laws, and NOAA is requesting an additional $1.6 million to work with international partners to block the flow of illegal, unreported, and unregulated-caught fish into the global stream of commerce, and ultimately, into the U.S. market.

We are proud that U.S. fisheries are among the world's most sustainable. However, we also know that environmental and economic factors can lead to changes in fisheries that put the economic and environmental resilience of coastal communities at risk. To provide additional support to fisheries that the Secretary has designated a disaster, NOAA requests $9 million in funding for a new Fisheries Disaster Assistance program. By focusing on both environmental

and economic resilience, this new Fund will help the fishing industry and fishing communities address the causes and recover from a disaster, as well as 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.

Finally, NOAA is seeking almost $20 million in additional funds to increase consultation and permitting capacity related to the Endangered Species Act (ESA), Marine Mammal Protection Act, and Magnuson-Stevens Act Essential Fish Habitat. This funding will improve permitting and review timeframes for public and private development projects, including those in the Gulf of Mexico supported by the states, the RESTORE Council, and the Natural Resources Damage Assessment Trustees. Demand for consultations is significantly rising: from FY 2012 to FY 2014, we saw a more than two-fold increase in the number of consultations we needed to complete. With such a surge in demand and no increase in resources, NOAA simply cannot keep pace and it has resulted in significant backlogs. At the end of FY 2015, NOAA had a backlog of 1,193 ESA consultations (250 formal, 943 informal), compared to 688 in FY 2014 and 377 in FY 2013. We expect demand to continue to increase, and funding for additional capacity is critical.

2. Investing in Observational Infrastructure that Underpins Environmental Intelligence
NOAA has operational responsibility to provide weather, water, ocean, and climate forecasts. Our global observing systems are the foundation of the information we provide – without them forecast reliability would decay and fail to meet the Nation's growing needs for more precision. We must ensure NOAA's fleet of research vessels and observational platforms can continue to provide the environmental intelligence needed to meet our mission.

Without investment, the NOAA fleet will decline by 50 percent from 16 to 8 active ships between FY 2016 and FY 2028, significantly hindering NOAA's ability to provide the critical observations and services the nation depends on. NOAA greatly appreciates the inclusion of $80 million in the FY16 Omnibus to begin recapitalization. In FY17, NOAA requests an additional $24.0 million to complete design, acquisition and construction of a Regional Survey Vessel (RSV). This RSV will be the first vessel of its class capable of integrated, interdisciplinary, and general-purpose oceanographic research throughout the U.S. Exclusive Economic Zone.

We must also ensure continuity of our satellite operations to continue to provide the data necessary for weather forecasts and environmental measurements into the future. The successful launches of the DSCOVR and Jason-3 satellites, and the upcoming launch of GOES-R and JPSS-1 are major milestones. We are very appreciative of the support Congress gave to NOAA's Polar Follow On (PFO) satellite program in the FY 2016 Omnibus. This year's budget includes $393 million for PFO to continue the JPSS-3 and JPSS-4 development activities and to invest in next

generation technologies that will set the stage for improved NOAA forecasts for decades to come.

3. Evolving the National Weather Service

NOAA's timely, accurate, and well-communicated forecasts inform important decisions in sectors ranging from food security and public health, to aviation, to general retail and of course to emergency management and national security. For this reason, we continue our commitment to build a Weather-Ready Nation and provide the technical underpinning to evolve the NWS to become a more agile organization.

The proposed FY 2017 budget focuses on investing in key ground infrastructure that provides the observations on which our forecasts and warnings are built. For instance, 85 percent of all tornado warnings are currently based on Next Generation Weather Radar (NEXRAD) data. Without investment, NEXRAD availability will degrade beginning in 2020, resulting in long-duration radar outages and regional gaps in service. That is why NOAA is requesting an increase of $8.5 million for the third year of an eight-year Service Life Extension Program (SLEP) to sustain the aging NEXRAD infrastructure. Continued funding for NEXRAD SLEP in FY 2017 will extend the useful life of a $3.1 billion investment by approximately 15 years while next-generation radar technology matures to operational readiness.

Another surface weather observation system that needs investment is the Automated Surface Observing System (ASOS). ASOS systems – a partnership program between the Federal Aviation Administration (FAA) and NOAA are generally located at airports and beam local conditions straight into airplane cockpits for safe navigation. The FAA has already secured funding for updating the ASOS software. In FY17, NOAA is requesting $7.5 million to being updating the hardware through a cost-effective approach that will extend the life of this program, while also providing greater safety, consistency, and accuracy. The ASOS SLEP requires $53 million over eight years to extend the system, which cost $227 million in the mid-1980s, for another 20 to 25 years. Without this investment, ASOS availability will degrade rapidly and cause data outages and regional gaps.

4. Achieving Organizational Excellence

Each and every day, NOAA's employees strive to promote organizational excellence and execute our mission with discipline and consistency. To ensure that our customers receive the best service possible, NOAA must be able to recruit, develop, retain, and reward the best talent. However, in order to do that, we need the infrastructure in place – the Mission Support Services – to support a workforce of the 21st century with Human Resources employees and services that enable NOAA to expeditiously recruit the expertise and talent that Congress, our partners, and our customers demand.

Mission Support Services at NOAA are at a critical breaking point. Based on data pulled in November 2015, there were periods of time in which one NOAA human resources professional serviced 148 NOAA employees – nearly three times the number serviced by HR professionals in peer agencies, such as the National Science Foundation, NASA, or the Nuclear Regulatory Commission based on FedScope data. The funding for these services and other core operations have declined since 2008, and the increased workload that results has led to an attrition rate of HR professionals that is twice that of other agencies.

To begin to reverse this trend, we are requesting funding in FY17 to transform NOAA's current service delivery model to a more efficient one. We have conducted an extensive organizational and process review of the HR function, and have determined it best to move routine HR work, like hiring, to a cross department initiative focused on mission enabling services. While this move will result in cost savings in the long-term, additional resources will be required to get started. The $2.3 million increase requested in FY17 for maintaining capability in the DOC Working Capital Fund is essential for us to create an improved HR tailored service function within NOAA. In addition, the requested $4.4 million for Mission Support Services is necessary to immediately begin to improve oversight, guidance, and administrative operations and services. Without addressing the lack of capacity in HR, NOAA cannot complete the actions it needs to fill the approximately 1,800 empty positions throughout the agency and hire weather forecasters, fisheries biologists, and other important personnel without whom our services are not possible.

We must also give our world-class scientists the tools to turn the investments made in earth science research and development into tangible benefits for American citizens and the economy. Unfortunately, the transition from research to operations often takes far too long. For example, NWS's High Resolution Rapid Refresh model, which has a spatial resolution four times finer than previous models and better pinpoints threats such as tornadoes, flash floods, and heavy snowfall, took 10 years to fully transition from research to operations. To cut this time down and accelerate the delivery of benefits to the public, NOAA has established the policies and administrative mechanisms needed to expedite transitions from the lab to commercial impact.

NOAA's Chief Scientist has spent the last year evaluating the best practices of industry and other agencies to develop the RTAP for identifying and investing in those projects that have a high probability for successful acceleration. The $10 million requested in FY17 will enable faster integration of research into operations to ensure that the American public experiences the benefits of previous federal investments in R&D.

Another key investment in FY17 is the $4.6 million to prepare for the replacement of our Mukilteo Research Laboratory in Seattle, WA. The current structural condition of the facility, which was built in the 1940s has deteriorated to the point that it poses an imminent safety risk to NOAA personnel. In 2015, immediate stabilization of the foundation was needed to render the

building safe for occupancy; but these efforts only extended its certification for occupancy by five years and require continuous monitoring and inspections. NOAA plans to replace the facility because of the unique attributes of the lab – more specifically the access to large volumes of high-quality seawater the location provides. Mukilteo's location plays a key role in the cutting-edge ecosystem recovery, marine pollution, and ocean acidification research undertaken by NOAA scientists, and it is an important NOAA asset that requires immediate investment.

Finally, we are also requesting $6.3 million to improve the resiliency of our data systems and mitigate critical cyber-security vulnerabilities, which is essential based on recent attacks to our systems. NOAA's Office of the Chief Information Officer will lead the effort to coordinate a clear enterprise analysis of the complex interrelationships among all NOAA IT systems. This includes mapping specific system linkages and documenting interdependencies to allow us to mitigate the risk to IT systems that support NOAA's Primary Mission Essential Functions.

CONCLUSION

NOAA's FY17 Budget request reflects the commitment Commerce Secretary Penny Pritzker and I have made to grow a strong economy that is built to last, while being fiscally responsible and focusing on priority initiatives. NOAA is a vital component of the U.S. Government, helping to maximize U.S. competitiveness, enable economic growth, foster science and technological leadership, and promote environmental stewardship. Americans – civilians, the military, and businesses – rely upon the services NOAA provides every single day.

We are fortunate to have a highly skilled and passionate workforce. Our people come to work each day committed to serving the public and advancing our mission. Every one of our investments in the FY 2017 budget – from improving products and services to positioning ourselves for the future – will help the organization as a whole strive for excellence and deliver the environmental intelligence this country needs to better prepare for and respond to the growing environmental challenges we face.

I look forward to working with the Congress and our partners and constituents to achieve the goals I articulated through the implementation of the FY 2017 budget. Thank you for the opportunity to provide NOAA's FY 2017 budget request.