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## OCEANIC & ATMOSPHERIC RESEARCH

Research models developed at NOAA's Pacific Marine Environmental Laboratory (PMEL) and used by the NOAA Tsunami Warning Centers accurately predicted the wave arrival time within 15 minutes for Hawaii, Alaska, and the U.S. West Coast during the Honshu tsunami event on March 11, 2011. The 9.0 magnitude earthquake was detected by a NOAA PMEL-developed Deep-Ocean Assessment and Reporting of Tsunamis (DART®) buoy three minutes after the earthquake. The tsunami was measured 25 minutes later.

The Honshu tsunami was generated by a magnitude 9.0 earthquake 80 miles east of Sendai, Honshu, Japan. Image shows a computer model simulation by the NOAA Pacific Marine Environmental Laboratory.

CREDIT **NOAA Environmental Visualization Laboratory**





# OFFICE OF OCEANIC AND ATMOSPHERIC RESEARCH

NOAA's Office of Oceanic and Atmospheric Research (OAR) is NOAA's central research line office. OAR supports and produces preeminent long-term and transformational research and technology innovation to advance NOAA's mission of Science, Service and Stewardship. OAR provides the Nation with critical environmental intelligence through atmospheric, oceanic, and Great Lakes research, technology development, and related services that support informed decision-making and promote healthy, productive and resilient ecosystems, communities, and economies.



*NOAA scientists Steve Brown (standing) and Nick Wagner (also with the Cooperative Institute for Research in Environmental Sciences) check data from an instrument aboard a research aircraft in California last year. NOAA researchers and collaborators used sophisticated instruments aboard this aircraft and a research ship to study a container ship's emissions in detail. The team found that as the ship shifted to low-sulfur fuels and slowed down near the coast, air pollution emissions plummeted, with some pollutants dropping by as much as 90 percent.*

By housing such research in a single line office, NOAA is able to emphasize innovative research and development (R&D) and contribute state of the art products to enhance America's competitiveness. NOAA's FY 2013 budget request recognizes the value of the research enterprise within the Agency and maintains a strong central research function in OAR.

To successfully support NOAA's mission, future operations depend on continued investment in innovative R&D. As such, NOAA's Next Generation Strategic Plan positions OAR to fulfill a NOAA-wide leadership role through responsibilities in three primary areas: holistic understanding of the Earth system through research; integrated environmental modeling; and climate adaptation and mitigation. As part of these three responsibilities, and armed with a mandate from the America COMPETES Act, OAR plays a leading role in identifying the emerging and innovative priorities in transformational research and atmospheric R&D that are consistent with NOAA's mission. OAR provides a comprehensive and integrated office that brings together the agency's existing science and research assets. This unique role of OAR strengthens research activities across the agency enabling NOAA to effectively balance its around-the-clock operational mission while maintaining a cutting edge scientific portfolio that fuels creativity and the next generation of products and services.

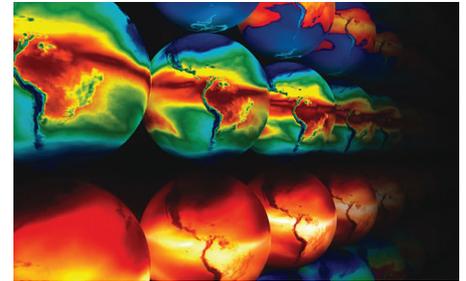
OAR consists of seven research laboratories and four programs located across the country as well as an extensive extramural network that includes multiple Cooperative Institutes with academia and thirty-two National Sea Grant institutions. These programs establish and maintain partnerships with



many university and research institutions. In addition, OAR works agency wide through the Research Council and with the other line offices as well as with private industry through the Small Business Innovation Research (SBIR) program. By working closely with its partners, OAR leverages their expertise and capabilities to expand the breadth and depth of our knowledge and skills to more efficiently and effectively serve the Nation, create jobs, maintain our country's competitiveness, and inspire and support America's next generation of scientists.

### FY 2011 ACCOMPLISHMENTS

This past year NOAA research upgraded their world class climate and earth system models for use in predicting and projecting climate variability and change. These enhancements will facilitate continuous improvements in NOAA's climate prediction tools on regional scales as well as on seasonal-to-decadal-to-centennial time scales. An additional advancement in climate and weather modeling was achieved with NOAA's partnership with the Department of Energy through an interagency agreement for high performance computing services in climate modeling. This agreement provides NOAA with high performance computing that leverages significant specialized expertise and unique capabilities established at the Oak Ridge National Laboratory (ORNL) in Tennessee.



*Climate simulation. Oak Ridge National Laboratory*

In June, 2011, the Western Governors' Association (WGA) and NOAA announced a joint agreement for improving the development and delivery of climate science and services to Western states. The Memorandum of Understanding was a timely agreement in the midst of a record-breaking season of extreme drought, flood, wildfire and severe storms. The WGA and NOAA committed to improve the development, coordination and dissemination of climate information to support the important long-range hazard planning priorities and resource management decisions of WGA members. The agreement will assist Western state resource managers, agencies and businesses who manage or are affected by natural disasters and weather variability.



*Browned out corn field near Los Fresnos, June 21, 2011, a casualty of drought and lack of irrigation outside of natural rains earlier in the spring*

### FY 2013 REQUEST

**\$413,820,000**

NOAA requests a total of \$413,820,000 and 758 FTEs to support the continued and enhanced operations of the Office of Oceanic and Atmospheric Research. This includes the Operations, Research, and Facilities (ORF) and the Procurement, Acquisition, and Construction (PAC) accounts. This is an increase of \$29,102,000 and 3 FTEs above the FY 2012 estimate. This increase includes \$25,926,000 and 3 FTEs in net program changes plus an increase of \$3,176,000 and 0 FTEs for Adjustments to Base (ATB).

The FY 2013 President's Budget Request for OAR supports the highest priority and most essential services for building a future Weather-Ready Nation and taking a global lead on improving and providing the scientific understanding of the changing climate system and its impacts, while continuing NOAA's emphasis on initiatives that support holistic ecosystem research.

The OAR budget is organized into four "sub-activities" or themes: (1) Climate Research – the study of complex climate systems to improve predictions and provide a reliable and authoritative source for climate data, information, and decision-support services; (2) Weather and Air Chemistry Research – to understand weather and air-chemistry events to improve forecasts and predictions and assist in saving lives and property; (3) Ocean, Coastal, and Great Lakes Research – to explore, investigate, and understand the complexities of our ocean,



coastal, and Great Lakes ecosystems and resources; and (4) Information Technology R&D - to accelerate adoption of advanced computing, modeling, communications, and information technology throughout NOAA.

**Climate Research:** The American public is increasingly concerned about the growing frequency and intensity of drought, floods, and other extreme events. OAR continues to take the global lead to improve and provide the scientific understanding of the changing climate system and its impacts, which requires advancing mission-critical climate modeling, national assessments, external and private-sector partnerships, as well as regional climate information and delivery. Easily accessible and relevant information is required to help communities better prepare for these events and make informed decisions. In addition, water resource and emergency managers require improved seasonal and sub-seasonal forecasts for optimum efficiency and preparedness.

NOAA's FY 2013 budget requests an increase of \$28.2 million to fund high-priority climate science to advance understanding of Earth's climate system and its atmospheric, oceanic, land, and snow and ice components. This increase will support Regional Integrated Sciences and Assessments (RISA) work and key ocean observations, including Deep Argo, development of an operational NOAA Climate Portal, as well as, funding for Climate Model Data Archives. This increase includes funding for Assessment and Earth System Science activities and will also restore funding for applied climate research and improved climate predictability, which improves NOAA's ability to provide research in support of the nation's decision makers for topics such as El Niño prediction, seasonal temperature/precipitation forecasts, changes in atmospheric composition, and other climate impacts.

**Weather and Air Chemistry Research:** In strong coordination with both internal and external partners, OAR will help build a future Weather Ready Nation by increasing our ability to anticipate and take appropriate precautions against such oncoming natural disasters as hurricanes, tornadoes, and tsunamis as well as significant heat, snow, and rain events. We can continually improve our warning systems and predictive capacity to minimize the loss of life and property. These improvements advance our predictive capacity so that NOAA can provide enhanced and expanded forecasts to inform emergency managers and other government agencies about high-impact extreme events.

**Ocean, Coastal, and Great Lakes Research:** NOAA has mandated responsibilities to support the sustainable use, protection, and restoration of coastal, Great Lakes, and marine ecosystems and the ecosystem services they provide to communities. OAR will continue to develop sound scientific information upon which decision makers can develop measured and effective regulations regarding food pathogens, storm mitigation efforts, and harmful atmospheric emissions. In addition, these ecosystems are frequently stressed by human activities, compounding natural variability and undermining their resiliency. OAR's ecosystem research improves our understanding of ecosystem dynamics and environmental stressors, provides innovative solutions to promote ecosystem resilience, and expands NOAA's management capabilities to address new challenges.

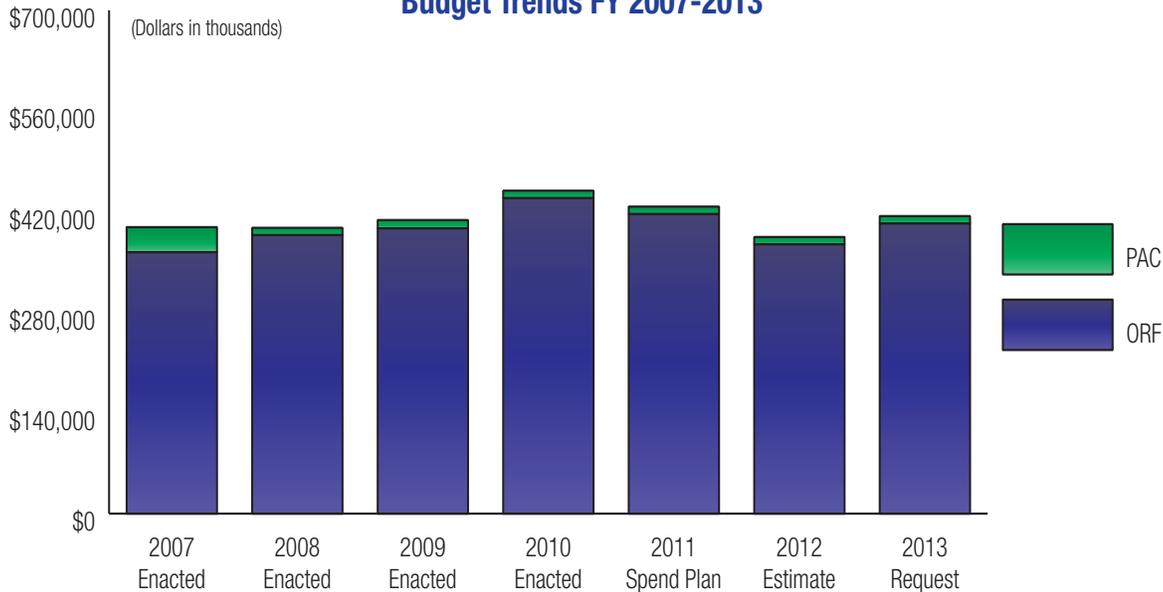
**Information Technology R&D:** OAR will accelerate the adoption of advanced computing, communications, and information technology throughout the agency. This Information Technology R&D supports OAR's High Performance Computing and Communications (HPCC) Initiative with promise for major improvements in weather and climate forecasting, ecosystem and ocean modeling, and environmental information dissemination. These improvements are heavily dependent on major advances in high-end computing power, advanced information technology, and the availability of environmental data and information. As a result, these critical investments will allow NOAA to meet its mission to deliver vital services and science education.



## OFFICE OF OCEANIC & ATMOSPHERIC RESEARCH

(DOLLARS IN THOUSANDS)	FY 2011 SPEND PLAN	FY 2012 ESTIMATE	FY 2013 REQUEST	INCREASE (DECREASE)
<b>OAR — ORF</b>				
Climate Research	\$218,934	\$182,978	\$212,683	\$29,705
Weather and Air Quality Research	69,410	67,779	69,542	1,763
Ocean, Coastal, and Great Lakes Research	115,262	114,719	108,838	(5,881)
Information Technology, R&D & Science Education	13,031	8,946	12,378	3,432
<b>Total, OAR - ORF</b>	<b>416,637</b>	<b>374,422</b>	<b>403,441</b>	<b>29,019</b>
Total, OAR - PAC	10,358	10,296	10,379	83
<b>GRAND TOTAL OAR (Direct Obligations)</b>	<b>\$426,995</b>	<b>\$384,718</b>	<b>\$413,820</b>	<b>\$29,102</b>
<b>Total FTE</b>	<b>770</b>	<b>755</b>	<b>758</b>	<b>3</b>

### OFFICE OF OCEANIC & ATMOSPHERIC RESEARCH Budget Trends FY 2007-2013



ORF: Operations, Research, and Facilities

PAC: Procurement, Acquisition, & Construction



## FY 2013 ORF BUDGET SUMMARY

NOAA requests a total of \$403,441,000 and 758 FTEs to support the Operations, Facilities, and Research (ORF) of the Office of Oceanic and Atmospheric Research. This is an increase of \$29,019,000 and 3 FTEs from the FY 2012 estimate. This includes an increase of \$25,843,000 and 3 FTEs in net program changes plus an increase of \$3,176,000 and 0 FTEs for Adjustments to Base (ATB).

### ORR – ORF PROGRAM CHANGE HIGHLIGHTS FOR FY 2013:

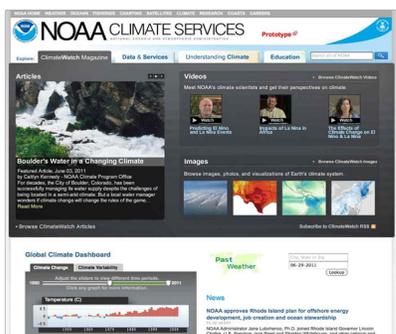
Select program changes (generally above \$500,000) are highlighted below at the sub-activity level. A summary of funding by Program, Project and Activity (PPA) is located in Chapter 9, Appendices. Detailed descriptions of all program changes by PPA are located in the NOAA FY 2013 Congressional Justification.

### CLIMATE RESEARCH

**\$212,683,000**

NOAA requests an increase of \$28,166,000 and 14 FTEs in the Climate Research sub-activity for a total of \$212,683,000 and 380 FTEs.

Climate Data and Information: NOAA requests an increase of \$1,689,000 and 2 FTEs. This is comprised of two increases and one decrease:



NOAA's Climate Portal--[www.climate.gov](http://www.climate.gov)

**NOAA Climate Portal: NOAA requests an increase of \$542,000 and 2 FTEs to continue supporting development of the NOAA Climate Portal.** The Climate Portal will serve as the public's primary online point of entry into NOAA's climate science and services and will be a central component of NOAA's commitment to integration and delivery of climate services enhancing public access to useful climate data and information. The Portal will have unique audience-focused sections designed specifically to serve the needs of climate science decision makers and policy leaders, scientists, educators, and interested members of the public. In FY 2013, NOAA will include improvements to the Portal's interface, deliver a new section, called "Climate Conditions," which presents a data-driven digest of recent and near-future climate trends of interest and relevance to society, and hire full-time administrative personnel to manage the system. Additionally, the agency will create an overarching Portal home page that integrates timely and topical content from each of the Portal's sections. NOAA has robust policies in place to govern information provided on the Climate Portal and is committed to clearly identifying and citing the information published so that users can easily trace the information back to its original scientific sources.

**Climate Model Data Archive: NOAA requests an increase of \$1,736,000 and 0 FTEs to generate and safely store model-based data records and support an operational archive and access capability for the next generation high-resolution weather and climate reanalysis datasets.** This project will further develop and implement a Climate Model Data Archive capability for the next generation climate analyses currently running on supercomputers across NOAA and its collaborators, including the National Science Foundation, the Department of Energy and others. NOAA will provide an operational data stewardship and user access capability for the next generation of climate reanalysis products. These products are derived for the utilization of major advancements in model physics and coupling across the ocean, air and land interfaces. The Climate Model Data

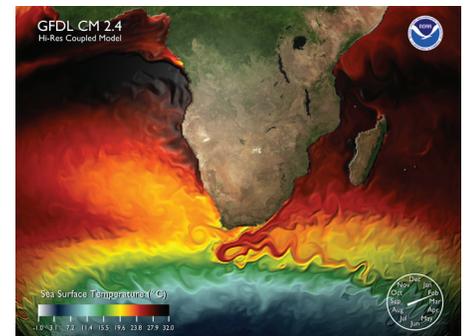


Archive leverages existing supercomputer resources to provide a unified and consistent suite of climate information to users at all levels so that they can make better decisions about their specific management needs. Information will be provided on time scales from days (weather) to months (El Niño) to years and decades (climate variability and change).

**Climate Operations: NOAA requests a decrease of \$589,000 and 0 FTEs to prioritize activities and maintain support for the transition of regional information applications to operational production and dissemination capabilities.** In FY 2013, NOAA requests to maintain core capability support for the production and dissemination of operational forecast products by maintaining model performance, forecast designs, and existing data users. Seasonal and inter-annual climate variability impacts life and property on local, regional, and global scales. Because societal impacts from climate variability and change extend down to sub-seasonal time scales, connections between climate and extreme weather events need to be identified to improve the forecast timing and location of extreme weather events.

Climate Competitive Research Program, Sustained Observations, and Regional Information: NOAA requests an increase of \$26,311,000 and 12 FTEs. This is comprised of six increases:

**Earth System Modeling for Urgent Climate Issues: NOAA requests an increase of \$8,000,000 and 10 FTEs to enable continued development and use of state-of-the-art Earth System Models to address urgent climate issues, including sea level rise and Arctic climate change.** One of NOAA's missions is to provide predictive understanding of the climate. A primary tool for this activity is the earth system model (a numerical software coding of the physics and chemistry of the atmosphere, ocean, land, and cryosphere run on high performance computers). The outputs of these models, ranging from seasonal forecasts to century long projections of the future state of the climate, are utilized by the research community, climate assessments (such as the Intergovernmental Panel on Climate Change), and, increasingly, decision making communities. In FY 2013, NOAA will use this funding to continue development of Earth System Models to explore the uncertainties in sea-level rise projections and to examine the terrestrial carbon cycle and future biogeochemical feedbacks on climate; as well as to address gaps in the understanding of the Arctic climate system, including rapid changes. These improved models will also examine the potential for decadal climate predictions and better understanding of abrupt change, such as the sudden onset of extended droughts. Funding will support these developments through a combination of 10 FTE, post-doctoral researchers, and contracts managed primarily by the NOAA Geophysical Fluid Dynamics Laboratory with assistance from the NOAA Earth System Research Laboratory and US academic community. The NOAA Climate Program Office will manage the grants for this request.



*Sea surface temperature (SST) simulation from GFDL's high resolution coupled atmosphere-ocean model. As the animation focuses on various locations of the world ocean we see the major current systems eg. the Agulhas current, Brazil current, Gulf Stream, Pacific Equatorial current, Kuroshio current. The small scale eddy structure is resolved and evident.*

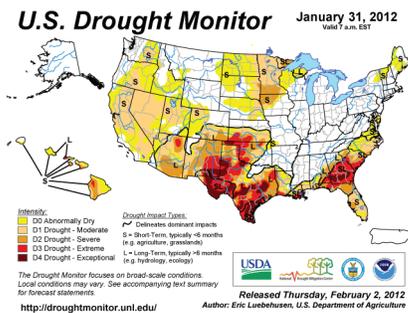
**Assessment Services: NOAA requests an increase of \$2,619,000 and 0 FTEs to support a permanent capability to produce climate assessments at national and regional scales.** Periodic climate assessments are essential to ongoing efforts to understand what climate change means for the United States and what services are necessary to allow for informed decision-making. In FY 2013, this increase will help support a permanent capability to produce climate assessments at national and regional scales, leading the



development of relevant and authoritative regional assessments targeted to regional stakeholders. In addition, NOAA plans to create a user-focused interface that links foundational assessment information with other tools and applications across the Government. These assessments will contribute to the legislatively mandated National Climate Assessment and future international climate assessment and will contribute to, the interagency Global Change Information System (GCIS), which is a system that provides public access to datasets and conclusions made through the National Climate Assessment (NCA), furthering the NCA's goal of traceability and transparency. Climate assessments will leverage both operational and research elements of NOAA, and will 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.

**Global Ocean Observing System (GOOS): NOAA requests an increase of \$4,601,000 and 1 FTE to make progress in critical ocean observations and analysis, Arctic monitoring, and more comprehensive deep ocean monitoring.** Ocean observations serve as the foundation for understanding and forecasting Earth's climate system, enabling real-time monitoring of ever-changing ocean conditions and seasonal-to-decadal climate forecasts and analyses for a broad spectrum of societal applications. In FY 2013, NOAA requests an increase in support for three components of the Global Ocean Observing System: 1) critical ocean observations and analysis; 2) progress in observational efforts in the rapidly changing Arctic; and 3) technology development to improve our understanding of the deep ocean via deployment of Deep Argo Floats that would provide valuable information on sea level rise and the global energy balance.

**National Integrated Drought Information System's (NIDIS) Regional Drought Early Warning Information Systems: NOAA requests an increase of \$1,500,000 and 0 FTEs to develop Regional Drought Early Warning Information Systems (RDEWS) by providing focused drought impacts research and applications development to underserved regions of the country.** Extending products, tools, and knowledge to areas outside of the NIDIS Pilots is the final stage of implementing a national early warning information system for drought. In order to implement the NIDIS Act, NOAA coordinates and integrates drought research, monitoring, forecasting, and early warning information and tools to improve drought risk management across the United States. The funding requested for competitive research grants and contracts will build upon work already in progress to develop the Regional Drought Early Warning Information System (RDEWS) by providing focused drought impacts research and applications development to underserved regions of the country. This funding will also provide research and products relevant to stakeholders and create coordinated and authoritative early warning systems for water resources, agriculture and ecosystem management in key drought sensitive regions. Better and earlier warnings for droughts will provide decision-makers, resource managers and citizens with the information to plan ahead, for example, minimizing water usage and planning for crop production based on drought information.

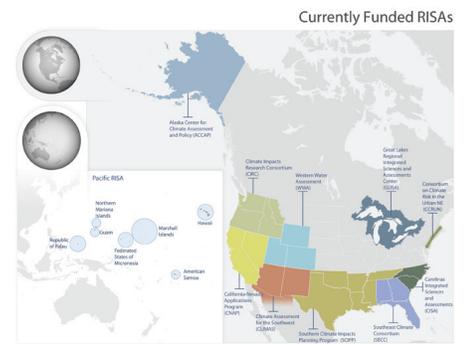


NOAA's U.S. Drought Monitor for January 31, 2012



**Climate Science on the Global Carbon Cycle, Aerosols, and Atmospheric Chemistry to Improve Climate Models and Predictions:** NOAA requests an increase of \$6,491,000 and 0 FTEs to provide a process-level understanding of the climate system through observation, modeling, analysis, and field studies to support the development of improved climate models for use in climate assessments. NOAA, in collaboration with its academic partners including Cooperative Institutes, will advance the understanding of the global carbon cycle and the role of aerosols and chemically active greenhouse gases in the global climate system. This is critical to our understanding of how different components in the atmosphere affect the climate. This knowledge will allow decision-makers to make more informed decisions on adaptation strategies. This research will be done in collaboration with members of the NOAA ESRL Carbon Tracker team and the GFDL Climate and Ecosystems group to incorporate new models into CarbonTracker and to improve the ocean component of Earth System Models.

**Regional Integrated Sciences and Assessments (RISA):** NOAA requests an increase of \$3,100,000 and 1 FTE to expand capability for regional research and information services. In FY 2013, NOAA will increase its support of external research teams who work with resource managers and planners to develop and utilize new information about the impacts of climate on communities, natural and managed resources, infrastructure, transportation, and health. A new region would be funded through a competitive process, and funds will be used to augment and ensure explicit collaborative partnering with NOAA's regional information system components such as NIDIS, NESDIS Regional Climate Service Directors, NOS Coastal Services Centers, NWS Regional offices, NMFS regional offices, as well as other Federal, state, and private providers. RISAs will develop a new suite of applied research products specifically to inform regional networks of information providers, assess the extent to which the regional network is providing "actionable science" able to be taken up into practical decision making, and provide research-based decision support for adaptation such as understanding economic costs benefits. RISA scientists provide information that decision makers can use to cope with drought, understand climatic influences on wildfire, and assess climate impacts on the transportation sector, coastal communities and human health. Stakeholders can use such information to evaluate potential climate change impacts on water supplies and hydroelectric power and support disaster management planning.



*Regional Integrated Sciences and Assessments (RISA) supports research teams that conduct innovative, interdisciplinary, use-inspired, and relevant research that informs regional resource planning and management*

**WEATHER & AIR CHEMISTRY RESEARCH \$69,542,000**

NOAA requests an increase of \$1,071,000 and 0 FTEs in the Weather & Air Quality Research sub-activity for a total of \$69,542,000 and 210 FTEs.

Laboratories and Cooperative Institutes: NOAA requests an increase of \$1,026,000 and 0 FTEs. This is comprised of one increase and one increase below \$500,000:

**Wind Boundary Layer Research to Support Improved Forecasts:** NOAA requests an increase of \$855,000 and 0 FTEs for wind boundary layer research to advance weather forecast quality and accuracy. Much of what we know now about wind is very low to the ground where people live and at altitudes where aircraft fly and storms occur. Very little is known about the wind at mid-altitudes, the height in which we deploy



A collection of wind turbines near farm fields

wind turbines. A better understanding of those mid-level altitudes will allow us to advance weather forecast quality and accuracy and allow for more accurate predictions. In FY13, funding will be used to deploy regional wind test beds designed to determine the optimal mix of instrumentation needed for wind resource characterization and forecast improvement within the region. NOAA will perform scientific analyses and develop Numerical Weather Prediction (NWP) models using the data collected at the test beds. NOAA will also use the funding in FY13 to improve our High Resolution Rapid Refresh weather model. The additional observations collected at the test beds will be used to initialize the HRRR model and equip it with more accurate initial values of weather parameters, so that it can produce a more accurate forecast of wind speeds and direction

### OCEAN, COASTAL, & GREAT LAKES RESEARCH

**\$108,838,000**

NOAA requests a decrease of \$6,826,000 and 11 FTEs in the Ocean, Coastal, & Great Lakes sub-activity for a total of \$108,838,000 and 155 FTEs.

Laboratories and Cooperative Institutes: NOAA requests a decrease of \$2,365,000 and 2 FTEs. This is comprised of one increase and two decreases:

**Ocean Coastal and Great Lakes Research Laboratories and Cooperative Institutes: NOAA requests a decrease of \$1,000,000 to reflect a reduced need for Cooperative Institute support for planned research projects in FY 2013.** This is a strategic realignment within NOAA's science mission to maintain progress in higher priority areas. In FY 2013, funds will be used to continue improving protection, restoration and management of coastal and ocean resources, monitor ocean, coastal and Great Lakes ecosystems including coral, support ecosystem modeling and forecasting, and encourage technology transfer and efficient resource management. NOAA will continue its traditional relationships with the Cooperative Institutes in accomplishing the above objectives. However, rather than a dedicated pool of funding available for such efforts, the NOAA research labs will continue to involve CI researchers using their base resources and making awards to the CI's in those instances where they can make significant advances through such partnerships.

**Ocean Research Advisory Panel: NOAA requests an increase of \$300,000 and 0 FTEs to support the Ocean Research Advisory Panel (ORAP).** ORAP functions as the science advisory body to the National Ocean Council and includes members from the National Academies, state governments, academia, and ocean industries. The Administration will submit legislation to transfer ORAP responsibly from the Department of Defense to NOAA. NOAA as the nation's premier ocean research agency is the appropriate place to support this organization

**Great Lakes Environmental Research Laboratory (GLERL): NOAA requests a decrease of \$1,665,000 and 2 FTEs to terminate activities in order to realize efficiencies within the lab.** At the reduced level, NOAA will continue to provide research services in the Great Lakes such as forecasts of toxic harmful algal blooms; forecasts of wind, waves, fog, ice, and channel depths, and forecasts of rip currents and pathogen delivery to beaches.



National Sea Grant College Program: NOAA requests a decrease of \$571,000 and 3 FTEs. This is comprised of one decrease and two increases, two of which is below \$500,000:

**Aquatic Invasive Species: NOAA requests a decrease of \$999,000 and 3 FTEs to terminate its national competitions for Aquatic Invasive Species (AIS).** The Sea Grant AIS Program conducts research, education, and outreach activities to create tools to help states, communities, fishery commissions, industries, and individuals prevent and control invasive species. In FY 2013, NOAA requests the elimination of Sea Grant's national AIS research and outreach competitions. NOAA will continue to support aquatic invasive species activities in other NOAA programs and will continue to provide support to the local, state, and regional invasive species research that are expected to continue.

**Marine Aquaculture: NOAA requests an increase of \$247,000 and 0 FTE to enhance Sea Grant's support of national grant competitions for marine aquaculture research and technology transfer.** Sea Grant facilitates the transfer of aquaculture research and technology into business operations, as well as informs the public and practitioners about key issues and information related to aquaculture. Environmentally and economically sustainable aquaculture helps meet the increasing demand for seafood, creates and sustains jobs, stabilizes economies in coastal working waterfronts, and supports efforts to manage and rebuild wild fish stocks.

Ocean Exploration and Research: NOAA requests a decrease of \$3,910,000 and 6 FTEs. This is comprised of one decrease and one increase, which is below \$500,000:

**National Undersea Research Program (NURP): NOAA requests a decrease of \$3,985,000 and 6 FTEs to terminate the National Undersea Research Program (NURP) component of OER.** NOAA determined that NURP was a lower-priority function within its portfolio of research activities, particularly given that other avenues of Federal funding for such activities might be pursued. NOAA will continue to support the Ocean Exploration program, which delineates the Extended Continental Shelf and produces significant discoveries in deep sea research. Competitive grants for related activity will continue to be offered through NOAA and other Federal programs.

#### **INFORMATION, TECHNOLOGY, RESEARCH & DEVELOPMENT    \$12,378,000**

NOAA requests an increase of \$3,432,000 and 0 FTEs in the Information, Technology, Research and Development sub-activity for a total of \$12,378,000 and 13 FTEs.

High Performance Computing: NOAA requests an increase of \$3,432,000 and 0 FTEs. This is comprised of one increase:

**High-Performance Computing and Communication (HPCC): NOAA requests an increase of \$3,432,000 and 0 FTEs to resume and restore applied information technology R&D suspended in FY 2012.** Investment in IT R&D is crucial for NOAA to continue to fulfill its mission. NOAA's HPCC program supports IT and computing research to make major improvements in the Nation's ability to forecast the weather and climate and to disseminate environmental information. Past critical investments in IT and HPCC have ensured that NOAA has the best weather forecast and climate models. The Nation is safer



and our decision-makers have the best data at their fingertips as a result of the Nation's strong history of investing in IT and computing. The funding request will support the IT innovation for approximately 15-20 IT applied R&D innovation projects in environmental modeling and software development.

*NOAA High Performance Computing Systems at Oak Ridge National Laboratory*

