CHAPTER 6

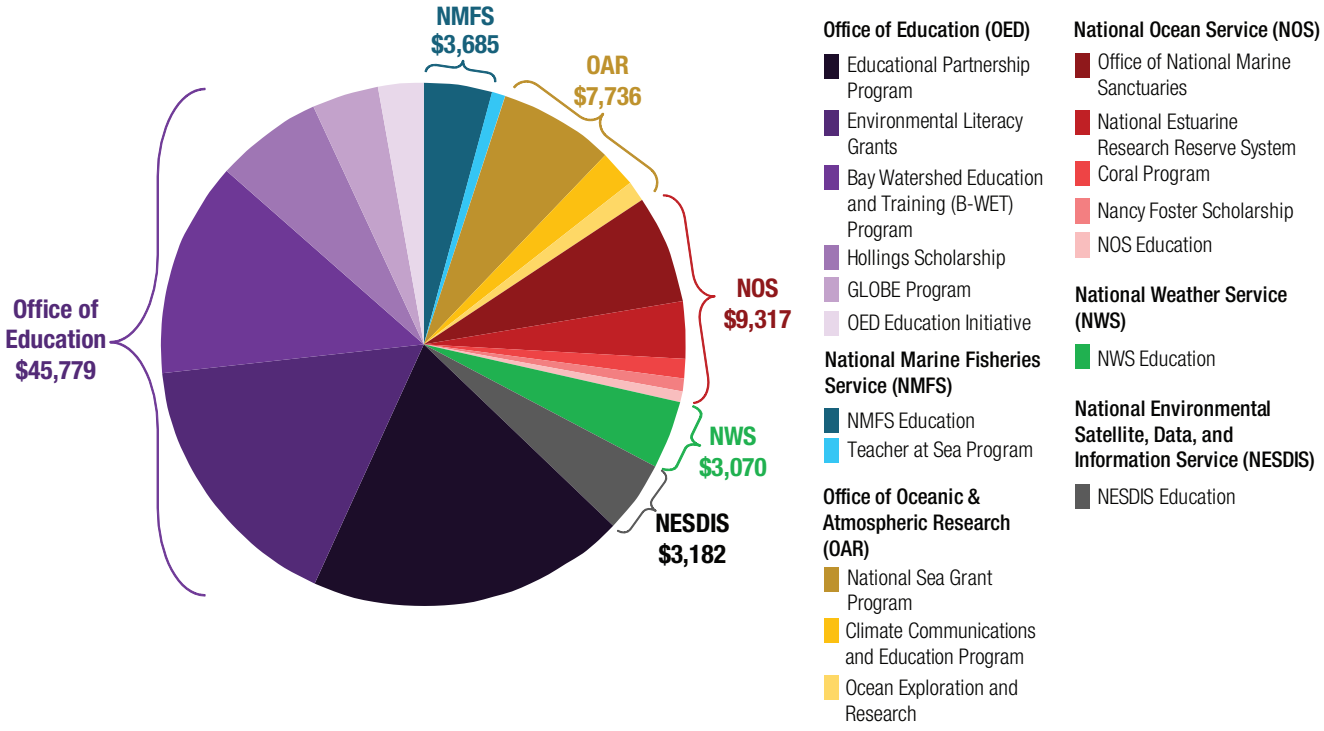
NOAA Education

NOAA'S EDUCATION MISSION

The America COMPETES Reauthorization Act, 2010 (P.L. 111-358) gives NOAA broad authority for educational activities. Stemming from this statute and other program-specific education mandates, the NOAA education community works collaboratively to advance the priorities outlined in NOAA's Education Strategic Plan and meet NOAA's Education Mission: "To advance environmental literacy and promote a diverse workforce in ocean, coastal, Great Lakes, weather, and climate sciences, encouraging stewardship and increasing informed decision making for the Nation." In FY 2010, NOAA's investment in education was $72.8 million, including congressionally directed spending–1.5% of the total NOAA enacted FY 2010 budget.

NOAA STEM Education Investment by Program for FY 2010, in $1,000s

Total Education Budget for FY 2010 = $72.8 Million

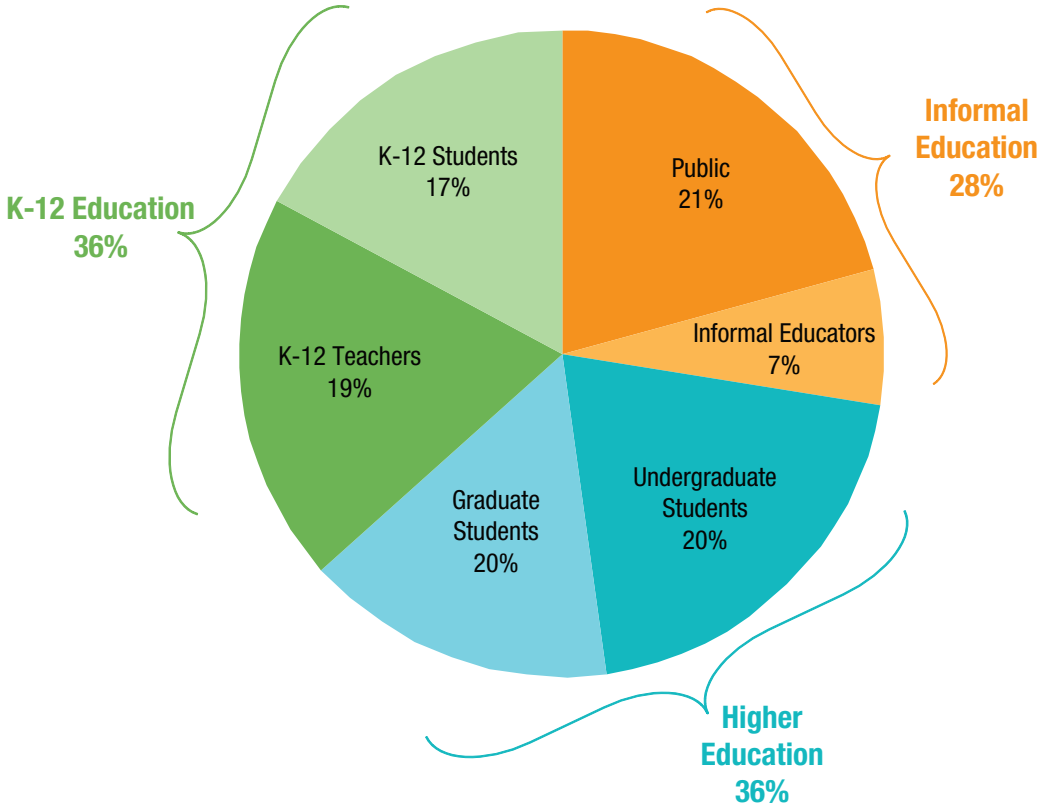


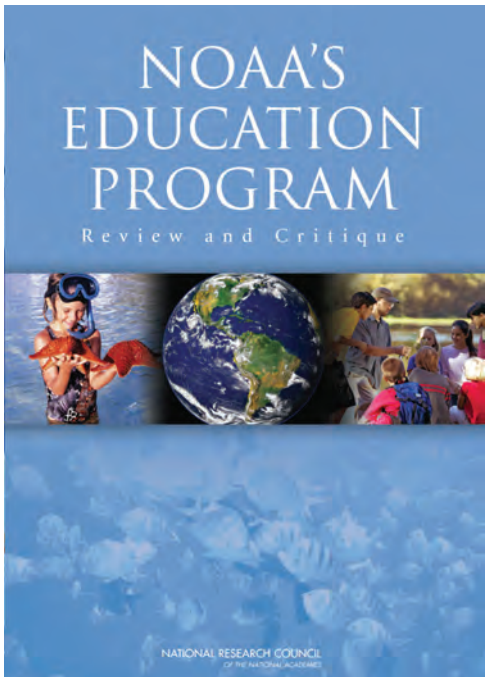
In FY 2012, NOAA estimates an investment of approximately $52.7 million in education funding, of which $20.8 million is for the Office of Education through the "Competitive Educational Grants and Programs" budget line. This request includes $14.4 million for the Educational Partnership Program, $5.0 million for the Competitive Education Grants Program and $1.4 million to pay for salaries and administrative costs. The balance of the FY 2012 NOAA Education request is within each line office.

WHO WE SERVE

NOAA has several formal and informal education programs and initiatives covering a wide range of Science, Technology, Engineering and Math (STEM) fields, including ocean, atmospheric, climate, and environmental sciences. Combined, these programs form a robust education portfolio that not only makes use of NOAA resources and capabilities, but also leverages those external to NOAA through a wide array of partnerships with schools, academic and education institutions, and other federal agencies, reaching several audiences across the Nation. NOAA education programs focus on connecting the public, students (K-12 through post-graduate) and educators across the country with NOAA-related sciences with the ultimate goal of increasing STEM competitiveness, promoting environmental literacy and helping to create a future workforce that reflects the diversity of the Nation. The following are just a few of NOAA's FY 2010 education accomplishments.

NOAA STEM Education Investment (FY'10) by Audience





National Research Council Report: "NOAA's Education Program Review and Critique"

NATIONAL ACADEMIES REVIEW OF NOAA EDUCATION

In 2008 NOAA contracted the National Research Council (NRC) of the National Academy of Sciences to perform a review of its education program and provide recommendations for optimizing NOAA's investment in education. The NRC report "NOAA's Education Program: Review and Critique" was released on March of 2010 (http://www.nap.edu/catalog.php?record_id=12867).

The report is very supportive of NOAA's education programs and commends NOAA for its leadership and role in STEM education. The report provides findings and excellent recommendations for moving forward in five areas: 1) NOAA's role in education; 2) Education goals and outcomes; 3) Composition and management of the education portfolio; 4) Education evaluation practices; and 5) Evidence of impact. NOAA is using the recommendations from this review to increase the overall efficiency and reach of its education efforts.

Students in the 2010 Class of the Educational Partnership Program's (EPP) Undergraduate Scholarship Program participating in NOAA Restoration Day activities.

EDUCATIONAL PARTNERSHIP PROGRAM

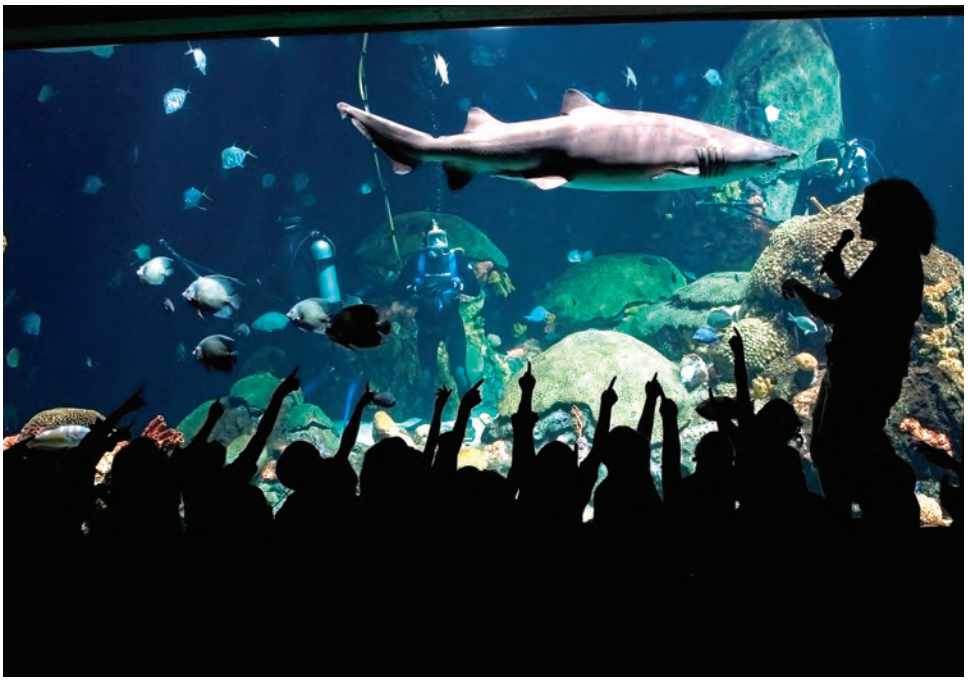
The Educational Partnership Program (EPP) with Minority Serving Institutions (MSIs) provides support primarily through grants for academic training, collaborative research, and experiential learning, through four competitive programs: Graduate Sciences Program (GSP), Undergraduate Scholarship Program (USP), Environmental Entrepreneurship Program (EEP), and Cooperative Science Centers (CSC). Students earn degrees while learning to conduct research in NOAA mission critical sciences. The program's goal is to increase the number of students, particularly from underrepresented communities, who are trained and graduate with degrees in NOAA mission critical fields, while strengthening NOAA's research capacity. Each of NOAA's five Cooperative Science Centers is led by an MSI. The EEP strengthens the capacity of MSIs to train underrepresented students in the NOAA sciences for careers; entrepreneurship opportunities in the application of NOAA science and technology; and advanced academic degrees in NOAA mission critical fields. For FY 2012, NOAA requests $14.4 million for the EPP.

FY 2010 Accomplishments:

FY 2010 EPP accomplishments include the recruitment of 10 students to USP, six students to GSP; and 132 Cooperative Science Center students graduating with STEM degrees. A total of 82 CSC students and two GSP trainees have been hired by NOAA. These students are working in very diverse areas of NOAA, for example, one student is a Research Meteorologist and works on projects that improve tropical cyclone forecasting in the National Weather Service at the National Center for Environmental Prediction.

The FY 2010 EEP-funded project entitled, "Greenproofing: Growing an Environmental Enterprise" is a student-driven demonstration and a business consulting venture. These entrepreneurs have gained real-life experience retrofitting existing buildings in the local Harlem, New York City community with green roofs.

For more information about EPP please visit: http://www.epp.noaa.gov/epp_about_us_page.html



Students observe the underwater environment at the Tennessee Aquarium. With the help of a 2009 ELG award, the Aquarium staff has reached over 23,000 underrepresented students through outreach programs and Experiential Learning Centers.

ENVIRONMENTAL LITERACY GRANTS PROGRAM

The Environmental Literacy Grants (ELG) program provides support to improve environmental literacy among our Nation's citizens and promotes a diverse workforce in ocean, coastal, Great Lakes, weather, and climate sciences, with the goal of encouraging stewardship and increasing informed decision making for the Nation. ELG funds a broad range of education projects implemented on regional to national scales, with a focus that alternates between informal and formal education. The program aligns with NOAA's mission goals and Education Strategic Plan and supports the President's "Educate to Innovate" campaign. ELG competitions also require robust project evaluation; promote best practices; complement other federal granting programs; emphasize partnerships that facilitate the integration of NOAA assets into education programs; and promote climate, ocean, and atmospheric literacy. For FY 2012, NOAA requests $5.0 million for Environmental Literacy Grants.

FY 2010 Accomplishments:

Since 2005, 76 competitive awards totaling $40.6M have been granted, supporting a wide range of project types. Demand for these awards is very high, and in FY 2010, 357 letters of intent and 95 full applications were reviewed. With the available funding, 17 new awards were made. In addition, NOAA also funded nine continuing awards initiated in FY 2009. The FY 2010 awards, which emphasize informal and nonformal science education, support projects that enhance or expand museum exhibits using data visualization; expand public participation in science; develop family programs for underserved/underrepresented audiences; and enhance teen environmental education programs. For example, the Community Collaborative Rain, Hail and Snow Network (CoCoRaHS),a citizen science network that engages volunteers in precipitation monitoring in all 50 states, is using its 2010 ELG award to advance the use of interactive advanced technologies to improve climate literacy among a broader, younger, and more diverse audience (www.cocorahs.org).

For additional information about the ELG Program please visit: http://www.oesd.noaa.gov/elg/elg_projects.html

Class of 2010 Ernest F. Hollings Scholars at the Cooperative Oxford Laboratory.

ERNEST F. HOLLINGS UNDERGRADUATE SCHOLARSHIP PROGRAM

The Ernest F. Hollings Scholarship Program provides successful undergraduate applicants with up to two years of academic assistance and one 10-week NOAA internship that provides "hands-on" experience in NOAA-related science, research, technology, policy, management, and education activities. The Program's goals are: to increase undergraduate training in oceanic and atmospheric science, research, technology, and education; foster multidisciplinary training opportunities; increase public understanding and support for stewardship of the ocean and atmosphere and improve environmental literacy; recruit and prepare students for public service careers with NOAA and other natural resource and science agencies at the federal, state and local levels of government; recruit and prepare students for careers as educators in oceanic and atmospheric science; and to improve scientific and environmental education in the United States. The Ernest F. Hollings Undergraduate Scholarship Program is funded by an assessment of one-tenth of one percent of NOAA's overall appropriation. At the FY 2012 request level for NOAA, the program will receive $5.6 million.

FY 2010 Accomplishments:

In FY 2010 the program selected 139 students from 43 states and territories. Twenty-five of the 2010 Hollings Scholars attend Minority Serving Institutions. Students participated in internships across NOAA from Alaska to American Samoa. Students were trained in research areas related to NOAA mission critical sciences, including: shark research, numerical models that predict severe storms, tsunamis, precipitation estimates, climate variability, restoration of coral reefs, coasts and Great Lakes region, and oil spill cleanup.

For more information about the NOAA Hollings Scholarship Program please visit: http://www.oesd.noaa.gov/Hollings_info.html

District of Columbia high school student studies blue crabs in the Chesapeake Bay to help prepare for National Ocean Science Bowl.

NATIONAL MARINE FISHERIES SERVICE EDUCATION

The National Marine Fisheries Service (NMFS) education program translates marine science and management information into learning tools and opportunities for educators, students, and families. NMFS staff in 32 regional offices, science centers, and laboratories, reach thousands of teachers and students via hands-on science experiences inside and outside the classroom, professional develop opportunities through the National Science Teachers Association, internships, graduate and undergraduate programs, and resource materials. For FY 2012, NOAA estimates investing approximately $3.3 million in FY 2012 funds on NMFS education.

FY 2010 Accomplishments:

In 2010, NMFS and the National Ocean Service produced the first interactive video game on sea turtles, using innovative technology to meet a recovery action for threatened Loggerhead turtles. Geared toward students in grades 5-9 and educators, the game teaches the biology and life history of the loggerhead, while having students balance the resources needed to save the species. In addition, over 3,000 students engaged in conservation education activities about the critically endangered Right whale and endangered sea turtles. Across the country, NMFS also provided several hundred laboratory internship experiences for high school and university students. At the Partnership Education Program in Woods Hole, Massachusetts, students from diverse backgrounds and Minority Serving Institutions attended summer long classes and completed research with NOAA Fisheries scientists on topics such as Age/Growth Analysis of Yellowtail Flounder from Mark-Recapture Study and Fecundity and Histology of the Monkfish. At the Alaska Fisheries Science Center, interns worked with local scientists to conduct field and lab work aboard vessels and on research sites. Recent projects included collection and analysis of acoustic data on juvenile walleye Pollock and assisting with life history studies of California sea lions via behavior observations on California's San Miguel Island.

For more information about NMFS Education please visit: http://www.nmfs.noaa.gov

NOAA Teacher at Sea, Nicolle von der Heyde, weights and measures a Warsaw Grouper during a reef fish survey in the Gulf of Mexico on NOAA Ship *Pisces.*

TEACHER AT SEA PROGRAM

Since 1990, NOAA's Teacher at Sea Program has provided hands-on research experiences to teachers aboard NOAA ships working throughout the Nation's waters. In FY 2010, 31 teachers completed research cruises and now make up a portion of over 600 alumni from around the country who are using NOAA science and data in the classroom, reaching thousands of students each year. One of the 2010 teachers summed up her participation in the program by saying that "The Teacher at Sea experience was one of the most enriching and rewarding of my life. Without this program I never would have had the opportunity to work closely with scientists as a member of a research team. I am now able to communicate confidently with my students and the general public firsthand about the importance of ocean conservation, and the ongoing work of research scientists." For FY 2012, NOAA estimates investing approximately $0.6 million for the Teacher at Sea Program.

FY 2010 Accomplishments

NOAA's Teacher at Sea Program also piloted three other components in FY 2010 - Teacher in the Lab, Teacher in the Field, and Teacher in the Air. Teachers were placed for three to six weeks in laboratories, field sites, and on aircraft, respectively. In all four program components, elementary through college-level teachers work side-by-side with scientists in order to introduce real-world scientific research into their classrooms. Teachers who participate develop education products they use in their own school districts and that they share with other schools around the nation.

This year also marked the first external evaluation of the program. The evaluation concluded that "as a result of the NOAA Teacher at Sea Program, educators are changing their teacher behavior related to NOAA science and they now use NOAA data in their curricula development, discuss the career opportunities that support NOAA's mission, and provide their students with real-world examples of scientific research."

For more information about NOAA's Teacher at Sea Program please visit: http://teacheratsea.noaa.gov

Students learn about aquatic plants on the R/V *Clinton* during a Great Lakes Education Program (GLEP) cruise on the Detroit River. The GLEP program is designed to stimulate interest in the Great Lakes and help students understand their role in protecting these vital freshwater resources.

NATIONAL SEA GRANT COLLEGE PROGRAM

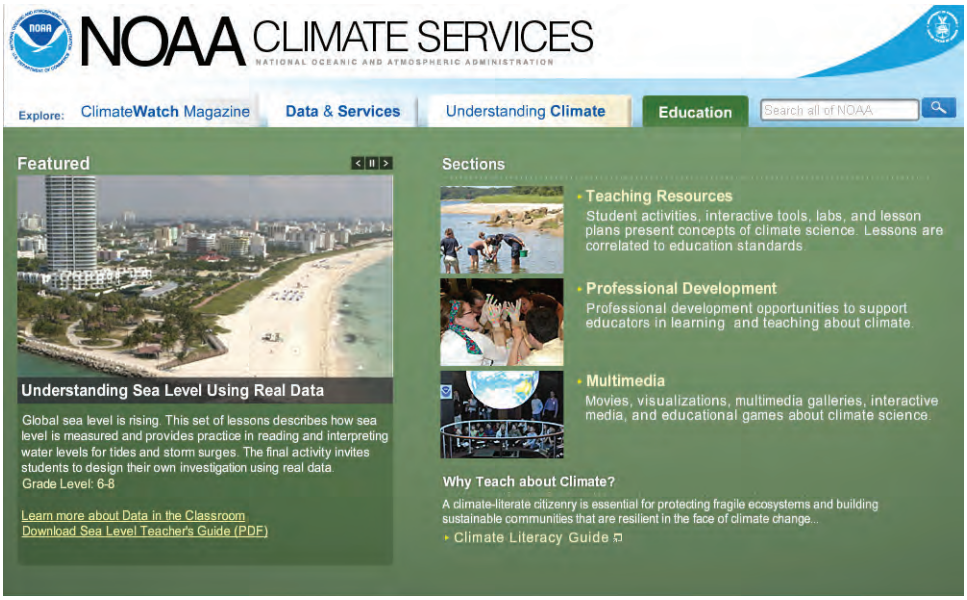
The National Sea Grant College Program's well-established Sea Grant Education Network (SGEN) consists of professional educators working at universities across the Nation to further NOAA's education goals of advancing environmental stewardship and workforce development. SGEN provides pre-college teachers with enhanced science content knowledge, instructional skills, and high-quality curricula for teaching students about watersheds, climate change, coastal processes, organisms and habitats, technology, ocean and Great Lakes literacy and marine and aquatic sciences. For FY 2012, NOAA estimates investing approximately $5.2 million for the SGEN.

FY 2010 Accomplishments:

During FY 2010, the SGEN conducted inquiry-based instruction for 5,851 teachers and 3,840 informal educators, and reached 380,875 students through those educators as well as through direct contact with Sea Grant Educators. The SGEN also developed 406 curricular activities ranging from lesson plans that encourage students to hone math and science skills by graphing and analyzing scientific data from NOAA data sets, to hands-on activities designed to teach teachers and/or students basic science principles such as buoyancy and water displacement, to online educational tools intended to promote increased environmental awareness.

SGEN also co-sponsors The Bridge (http://web.vims.edu/bridge/) - an extensive web-based marine education center offering more than 1,000 teacher-reviewed, classroom-friendly resources. Sea Grant is unique because it is required to match every $2 of federal funding with $1 of non-federal funds – with many state programs far exceeding this match. In FY 2010, 87% of SGEN funds were matched with non-federal funds. By leveraging additional money, Sea Grant expands the reach and effectiveness of NOAA and other partners in planning for and managing the future of America's ocean, coastal, and Great Lakes resources while, in turn, ensuring that the country receives the maximum benefit from every dollar invested in Sea Grant.

For more information on the SGEN please visit: http://www.seagranted.net



The Climate Portal prototype only scratches the surface of the many climate datasets, products, services, and educational resources available across NOAA and the federal government. This effort will gradually transition from a prototype to an operational status over the next year. The goal for the Portal is to become the "go-to" website for NOAA's and our partner's climate data, products, and services for all users.

CLIMATE COMMUNICATIONS AND EDUCATION PROGRAM

The NOAA Climate Communications and Education Program seeks to improve public climate science literacy and to raise public awareness and understanding of, and engagement with, NOAA's climate science and services programs. Climate Education produces and distributes a range of products, conducts programs, and collaborates in partnerships designed to help NOAA fulfill its climate goal (http://www.climate.noaa.gov/education/). For FY 2012, NOAA estimates investing approximately $3.0 million for the Climate Communications and Education Program.

FY 2010 Accomplishments:

» Developed the Climate Services Portal prototype (www.climate.gov) to support research and public education.

» Provided a variety of climate and related focused online learning experiences through partnerships with a variety of NOAA education programs and the National Science Teachers Association. Since May 2006, NOAA has sponsored and archived 35 90-minute live web seminars, which reach on average 50 teachers per seminar, thus providing virtual "in-person" support for approximately 1,750 teachers.

» Co-developed the CLEAN: the Climate Literacy and Energy Awareness Network Pathway, a digital resource for teaching about climate science, climate change and energy awareness – resources are reviewed by educators and scientists, annotated and aligned with national education standards (http://www.cleanet.org/).

» Increased programmatic coordination across the federal agencies through leadership at the US Global Change Research Program.

» Coordinated the development of the 2010 Climate Action Report's chapter on Education, Training, and Outreach (http://www.state.gov/g/oes/rls/rpts/car5/index.htm).

» Supported the Climate and Society Master's Program to enable understanding of climate science, decision processes, and social needs to deliver management strategies that incorporate climate.

Teachers participate in a day-long professional development institute in NOAA's Ocean Exploration and Research Program at the National Aquarium in Baltimore as they learn how hydrothermal vents are formed on the deep-sea floor.

OCEAN EXPLORATION AND RESEARCH PROGRAM

NOAA's Office of Ocean Exploration and Research is committed to engaging educators and their students in near-real time ocean exploration to raise America's environmental literacy and interest in the science, technology, engineering, and mathematics (STEM) disciplines. The program offers onsite and online opportunities for educators to learn about ocean exploration and how they can use STEM content associated with exploring the poorly-known ocean in classrooms. Educational offerings incorporate scientific data to introduce educators to ocean scientists and explorers, their research and deep-sea explorations. They also equip educators with exemplary tools and other resources that intrigue students in the world of ocean discovery. For FY 2012, NOAA estimates investing approximately $0.9 million on Ocean Exploration and Research Program education activities.

FY 2010 Accomplishments:

In FY 2010, educators and students learned about the first Federally-dedicated ship for ocean exploration, the NOAA Ship Okeanos Explorer, through new inquiry-based teaching materials that teach students about ocean exploration, the technologies used to explore the ocean, and what scientists might expect to find. Approximately 700 teachers received intensive onsite professional development (approximately 5,000 total teacher contact hours), reaching approximately 78,000 students. A total of 1,072 educators participated in the "Why Do We Explore?" online professional development offering, representing 45 states and 29 countries.

Formal evaluation of the program has shown that educators are very complimentary of the professional development offerings and that their content knowledge increases. After the course, one of the teacher participants said: "...I've been attending NOAA Online professional development courses since 2003, this one was truly the BEST! The presentations and organization of the information...allowed for a much deeper understanding and appreciation of the world in my front yard."

For more information about the Ocean Exploration and Research Program please visit: http://oceanexplorer.noaa.gov/edu/welcome.html

NOAA Office of National Marine Sanctuaries Educator, Dawn Hayes, conducting a water quality monitoring session at the Dive into Education Ocean Science Workshop in American Samoa.

OFFICE OF NATIONAL MARINE SANCTUARIES

National marine sanctuaries are living classrooms where people can see, touch and learn about our nation's spectacular marine life and rich maritime history. Since 1972, the NOAA Office of National Marine Sanctuaries (ONMS) has been federally mandated to promote STEM education through 13 national marine sanctuaries and one marine national monument. Through hands-on activities, teacher workshops, curricular materials, field studies, multicultural programs and innovative technology, the sanctuary system instills an ocean ethic that touches the hearts and minds of millions of people each year. For FY 2012, NOAA estimates investing approximately $4.2 million for ONMS education activities.

FY 2010 Accomplishments:

Highlights for FY 2010 include the Dive into Education Ocean Science Workshop hosted in American Samoa, which brought together 19 educators from the sanctuary system to conduct a two-day workshop with hands-on sessions for over 100 K-12 teachers. These sessions provided educational expertise, resources and training to support ocean and climate literacy in the classroom. An evaluation determined that 92% of teachers indicated they plan to use the educational materials produced by NOAA in their classroom, and 87% feel confident in their ability to incorporate ocean literacy principles into their classroom.

In FY 2010, the MERITO program, a multi-cultural education program, received the prestigious DOC Silver Medal Award. This program provides under-served students with hands-on, inquiry-based in-class and field activities. In addition, the NOAA ONMS finalized a 10-year education strategic plan (2010-2020), accompanied by a five-year implementation plan.

For more information about national marine sanctuaries education programs visit: http://sanctuaries.noaa.gov/education.

Students collect glass eels on several Hudson River tributaries as part of a "citizen science" project led by the Hudson River NERR (NY). In 2010 approximately 250 citizen-scientists participated and collected baseline information on migrating patterns of over 11,000 juvenile American eels in Hudson River tributaries.

Student's comments demonstrate their excitement for the project:

"It's taught me that I share my waters with awesome eels!"

"It has taught me that eels are smart and word spreads of the giant net in the river"

"I feel that I help the earth by doing the eel project"

Project website: http://www.dec.ny.gov/lands/49580.html

NATIONAL ESTUARINE RESEARCH RESERVE SYSTEM

The National Estuarine Research Reserves System (NERRS) aims to increase participant's environmental literacy and ability to make science-based decisions related to estuaries and coastal watersheds. Through NERRS education programs, students, teachers and community members gain real-world opportunities to acquire first-hand understanding of local estuary and coastal issues, use data from the Reserve System's System-Wide Monitoring Program, and develop the skills and motivation to become life-long leaders in addressing environmental issues. Research Reserves protect more than 1.3 million coastal and estuarine acres in 28 reserves located in 22 states and Puerto Rico for purposes of long-term research, education and stewardship. For FY 2012, NOAA estimates investing approximately $2.4 million for NERRS education activities.

FY 2010 Accomplishments:

In FY 2010, NERRS conducted 2,200 K-12 programs and trained 3,500 K-12 teachers. The Teachers on the Estuary Program provided several success stories of teachers and students working in their communities to improve conditions in their local watersheds and estuaries. For example, Patricia Busse was a participating teacher whose students, all 12th graders in AP Chemistry, set out to build and install monofilament fishing line recovery bins at fishing piers and boat ramps to encourage anglers to cast their used lines in these safe receptacles instead of allowing them to end up, even accidentally, in the Narragansett Bay.

In FY 2010, NERRS also conducted field-based programs for 80,000 K-12 students involving them in "citizen-science" projects. Reserves act as "living laboratories" giving volunteers opportunities to work alongside researchers and coastal educators. At the end of 2010, volunteers had contributed over 104,500 hours to various on the ground projects. Also in FY 2010, a Wisconsin Reserve was added to the System and a new educational interface was launched to support educators in using real-time data, from all 28 Reserves

For more information on the NERRS Program, visit: http://www.estuaries.gov/estuaries101/ScienceData/Home.aspx

Coral Reef Conservation Program staff conducting an ocean acidification demo, explaining how it impacts coral ecosystems, at the National Mall as part of "Hands Across the Ocean" event.

CORAL REEF CONSERVATION PROGRAM

The Coral Reef Conservation Program (CRCP) works closely with states and U.S. territories to address climate change, adverse impacts of fishing, and land-based sources of pollution that damage reef ecosystems. The program has a congressional mandate to conduct education and outreach activities to enhance public understanding and appreciation of coral reefs. Using Coral Reef Conservation Act funds, the program conducts localized education activities in the seven U.S. coral jurisdictions as well as assisting educators nationwide. For FY 2012, NOAA estimates investing approximately $0.8 million for CRCP education activities.

FY 2010 Accomplishments:

During FY2010, CRCP funded and led the ongoing development of an ocean acidification (OA) Data-in-the-Classroom project, among the first efforts to link real-time OA data to tailored lesson plans, supported by a dedicated database delivering science data over a teacher/student web interface. CRCP also funded fellowships in seven U.S. coral jurisdictions (Florida, US Virgin Islands, Puerto Rico, Hawaii, Commonwealth of the Northern Mariana Islands, Guam and American Samoa) that provide post-graduate opportunities and professional development while supporting local coral reef management projects. In the Pacific region, coral fellows organized and managed a six-week planting period, leading volunteers in the planting of nearly 25,000 grass and tree seedlings, coordinated a regional Climate Change summit to assist in local adaptation measures, and led a "Guardians of the Reefs" school program involving thousands of students in coral stewardship. In the Caribbean region, coral fellows advanced sustainable tourism planning and user assessments, led contractor training to reduce impacts from coastal construction, and initiated events bringing local communities closer to their reefs with plastic reduction campaigns and cultural events.

Also in FY 2010, CRCP programs hosted student interns, involving them in coral immune system research and experimental restoration efforts in floating nursery structures.

For more information about CRCP please visit: http://coralreef.noaa.gov/education/

Five of seven 2010 Class of Dr. Nancy Foster Scholarship Recipients.

DR. NANCY FOSTER SCHOLARSHIP PROGRAM

The Dr. Nancy Foster Scholarship Program recognizes outstanding scholarship and encourages independent graduate level research, particularly by female and minority students, in oceanography, marine biology and maritime archaeology. The scholarship provides a 12-month stipend, an annual cost-of-education allowance, and support for each scholar to conduct a four-to six-week research collaboration at a NOAA facility. Masters students may be supported for up to two years, and doctoral students for up to four years. At the FY 2012 request level for the National Marine Sanctuaries Program, the Dr. Nancy Foster Scholarship Program will receive $0.5 million.

FY 2010 Accomplishments:

Seven new scholarships were awarded in FY 2010. Some of the research activities by Nancy Foster Scholars will include how whales perceive objects and respond to sound as this can assist in development of a ship-alert device to prevent whale fatalities, and encourage international marine policies to reduce man-made noises. Also, investigating how sewage contamination of the reef environment can be monitored using sponges and coral as indicators will assist the Florida Keys National Marine Sanctuary with coral reef management and water quality research. Of the 47 total Dr. Nancy Foster Scholarships, 42 have been awarded to women; one recipient is now a Federal Employee, and three recipients are contractors to NOAA.

For more information about the Nancy Foster Scholarship Program, please visit: http://fosterscholars.noaa.gov/aboutscholarship.html

Educators in the Climate Stewards project attended the NOAA Symposium on Climate change at the National Science Teachers Conference and learned about the impacts of climate change on coral reef organisms and ecosystems.

NATIONAL OCEAN SERVICE EDUCATION

The National Ocean Service (NOS) Education team serves educators and students through websites and programs that promote environmental literacy using ocean, coastal, and climate science. Tools for teachers and resources for students are posted at http://oceanservice.noaa.gov/education. For FY 2012, NOAA estimates investing approximately $0.5 million for NOS education activities.

FY 2010 Accomplishments:

The Climate Stewards pilot project was started in FY 2010 and provided professional development opportunities to formal and informal educators and citizen scientists to increase climate literacy. The project is managed by NOS and welcomed a first group of 25 educators from 14 states for the pilot year. Participants include educators from K-12 schools, community colleges, broadcast meteorologists, and informal institutions. NOAA education programs from all line offices have provided planning and financial support for web seminars, conference symposia, online classes, mini-grants, and workshops to help participating educators understand climate science and implement stewardship action plans. An electronic library and multiple professional development opportunities were made available for the Climate Stewards and other educators through a partnership with the National Science Teachers Association.

NOS and National Marine Fisheries Service (NMFS) co-produced and launched the second online educational game in the WaterLife series, "Sea Turtles and the Quest to Nest" (http://games.noaa.gov/seaturtle/welcome.html) in early 2010. The Web-based game encourages loggerhead sea turtle conservation through a series of animations aimed at 4th–7th grade students, asks the player to take the role of six stakeholders to better understand the threats to sea turtles in the ocean and on the land, and provides students with ideas on how their behavior can have a positive impact on the nesting success of loggerheads.

For more information on NOS Education please visit: http://games.noaa.gov

Boy Scouts and NWS Meteorologist participate in Weather Merit Badge Training at the 2010 BSA Jamboree, Fort A.P. Hill, VA.

NATIONAL WEATHER SERVICE EDUCATION

A goal of National Weather Service (NWS) education is to minimize fatalities and injuries from severe weather. NWS educates different segments of the American population. The NWS public education programs include the Storm Spotter and StormReady programs, support to the FEMA Citizens Corps Program, and school visits and public awareness campaigns such as Hurricane and Lightning Awareness Weeks. For FY 2012, NOAA estimates investing approximately $2.9 million for NWS education activities.

FY 2010 Accomplishments:

In FY 2010 the NWS conducted 2,500 school visits engaging students in weather and safety information. Adult education is accomplished through the Storm Spotter Program. There are over 250,000 storm spotters in the country. The Storm Spotter Program trains local citizens to recognize severe weather in their local community and report those events to the local NWS Forecast Office.

The American Meteorological Society (AMS) NWS partnership trained over 900 new science teachers in weather forecasting, hydrology, climate, and NWS operations. Over 870 were trained through the DataStreme Atmosphere and Ocean teacher-enhancement courses conducted in fall semester 2009 and spring semester 2010, and 45 were trained at the summer 2010 Project Atmosphere and Maury Project workshops. The trained teachers share their atmospheric training with other science teachers (Teacher In-Service Days) in their school districts, assist education officials within their community on weather safety procedures and teach fundamentals of meteorology to their students.

At the 2010 Boy Scout Jamboree, the NWS awarded 228 Weather Merit Badges during the event. In addition, Boy Scouts participated in the daily launching and tracking of a weather instrument package which collects weather information during its ascent.

For more information about the NWS please visit: http://www.weather.gov/

Leesha Saunders of NOAA NESS explains how satellite data impacts daily weather forecasting and environmental monitoring at the Girl Scout's Linking Girls to the Land Eco-Expo, Ft. Wash., MD, April 18, 2010.

NATIONAL ENVIRONMENTAL SATELLITE SERVICE EDUCATION

NOAA's National Environmental Satellite Service (NESS) provides timely access to global environmental data to promote, protect, and enhance the Nation's economy, environment, and quality of life. NESS promotes cultural understanding and public awareness of NOAA sciences through nine offices and four data centers. For FY 2012, NOAA estimates investing approximately $1.9 million for NESS education activities.

FY 2010 Accomplishments:

In FY 2010, NESS conducted 115 presentations and 2 environmental literacy webinars reaching approximately 8,000 students (including Girl Scouts) and 2,500 teachers via tours, camps, fairs, conferences, public events, and developmental workshops. These presentations were given on Careers in STEM; Satellites; Climate; Satellite Resources and Opportunities for Educators; New Satellite Educational Products; and Using Data Visualization in the Classroom. Both educational sessions were hands-on in the subject areas of atmospheric, environmental and climate activities. The Girl Scouts were given briefings, demonstrations, and materials to support several badge requirements.

Partnerships with NASA, National Science Teachers Association, Federation of Earth Science Information Partners, and the Institute for Disabilities Research and Training, Inc., in FY 2010 resulted in the creation of six educational hands-on tools on hurricane, climate, sea surface temperature, and satellites. These specific subject matter handouts or kits included imagery, frequently asked questions, activities, posters, CDs or DVDs, and lists of resources.

NESDIS also produced two new environmental education resources in English, Spanish and American Sign Language; one new atmospheric science (K-12) activity book and over 45,000 STEM materials distributed to constituents. These products introduce, reinforce, and validate the learning and information that was taught and provides students a continued learning experience doing down time in the classroom.

For more information on NESDIS please visit: http://www.nesdis.noaa.gov

B-WET California student participates in sand dune restoration with the Beach Garden Dune Project in 2010.

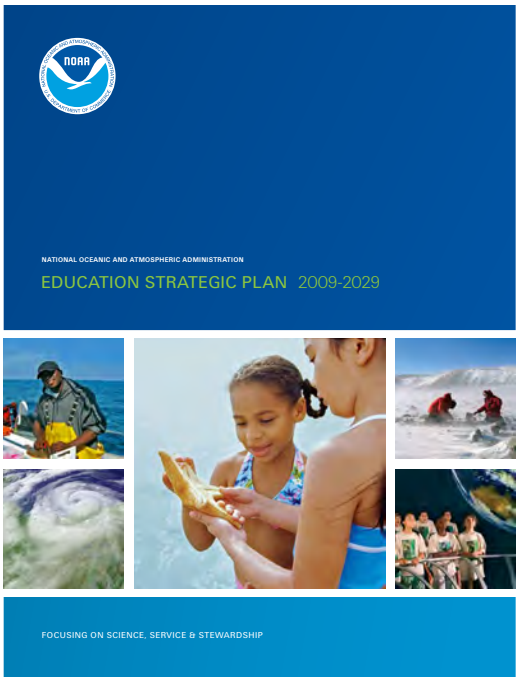
CONGRESSIONALLY DIRECTED NOAA EDUCATION PROJECTS

NOAA's education program has also received additional funds provided by Congress to increase environmental and ocean literacy. The Bay Watershed Education and Training Program (B-WET) and the Global Learning and Observations to Benefit the Environment (GLOBE) Program are two examples of NOAA's Congressionally-directed projects in FY 2010.

In FY 2012, NOAA is requesting a decrease of $17,870,000 for NOAA Education. This includes congressionally directed projects in the NOAA Education Initiative ($713,000), Competitive Education Grants ($6,957,000), B-WET ($7,200,000), and GLOBE ($3,000,000). The FY 2012 President's Request provides funds for NOAA's broader Competitive Education Grants Program.

For more information about the B-WET Program please visit: http://www.oesd.noaa.gov/BWET/

For more information about the GLOBE Program please visit: www.globe.gov



NOAA's *Education Strategic Plan (2009-2029)* is directly tied to NOAA's mission: "Science, Service and Stewardship - To understand and predict changes in climate, weather, oceans, and coasts, to share that knowledge and information with others, and to conserve and manage coastal and marine ecosystems and resources."

LOOKING AHEAD INTO FY 2012

NOAA's new strategic plan places a strong emphasis on education. Many of the challenges that NOAA helps address do not stem from a lack of information, but from an uneven distribution of information. NOAA's new mission statement includes sharing knowledge and information as a core part of what needs to be done. This strong agency endorsement of education at NOAA provides a vibrant foundation for enhancing education activities across the board and for increasing the coherence of the overall education program.

In FY 2011 and beyond, NOAA will continue to support K-12, informal and higher education programs across the country and in support of each of NOAA's mission goals and enterprises. The Education Council will continue to implement the 2009-2029 Education Strategic Plan (http://www.education.noaa.gov/). This plan provides a framework for NOAA's Education Programs to work collectively and collaboratively with external partners to advance environmental literacy and promote a diverse workforce in ocean, coastal, Great Lakes, weather, and climate sciences, encouraging stewardship and increasing informed decision making for the Nation.

NOAA will also work to address and incorporate recommendations from the NRC report "NOAA's Education Program: Review and Critique".

For more information on NOAA's Education Programs, please visit the NOAA Education Website: http://www.education.noaa.gov/