



NOAA FISHERIES

A Few Highlights from the Biennium (2013–2014)

- **198.** Acres of oyster reef in Virginia and Maryland tributaries restored by NOAA funding.
- **\$1.2 million.** Funding provided by NOAA to researchers to answer scientific questions about valuable fish and shellfish species in the Chesapeake Bay.
- **90,000.** Students participating in hands-on watershed science education through the Chesapeake Bay Watershed Education and Training (B-WET) Program.
- **224,138.** Visits to the www.buoybay.noaa.gov website to obtain real-time information about weather and water conditions at Chesapeake Bay Interpretive Buoy System sites.
- **6.** The number of river systems surveyed and mapped by NOAA for potential oyster habitat restoration sites.

NOAA Chesapeake Bay Office Biennial Report to Congress Fiscal Years 2013–2014

This report describes the activities of the National Oceanic and Atmospheric Administration (NOAA) Chesapeake Bay Office for fiscal years (FY) 2013 and 2014 under the NOAA Authorization Act, 15 U.S.C. 1511d. The NOAA Chesapeake Bay Office is a division of the National Marine Fisheries Service (NMFS) Office of Habitat Conservation. This report fulfills the Congressional requirement in Section 307 (b)(7) for a biennial report on the activities of the Office and on the progress made in protecting and restoring the living resources and habitat of the Chesapeake Bay.

The Chesapeake Bay is the Nation's largest estuary, with a watershed that encompasses one of the most economically significant and populous regions of the United States. The 2012 NOAA *Fisheries Economics of the United States* report indicates that the commercial seafood industry in Maryland and Virginia contributed \$3.34 billion in sales, \$901 million in income, and 34,674 jobs to the local economy. The Bay has two of the five major North Atlantic ports in the United States. It is a highly valued resource for a wide range of uses, including tourism, recreational boating, and scenic value. The estuary and its rivers are home to more



The Chesapeake Bay and its watershed comprise an ecologically and economically significant region.

than 3,600 species of plants and animals, including some 350 species of finfish and 175 species of shellfish. Over recent decades this biologically diverse ecosystem has seen sharp declines in some of its keystone species, including the native oyster and blue crab. Human effects on the ecosystem—such as overfishing, degraded water quality, and habitat destruction—have all contributed to this decline.

NOAA has been a partner in the Chesapeake Bay Program since the signing of a Memorandum of Understanding with the U.S. Environmental Protection Agency in 1984. In June of 2014, NOAA and its Federal and State partners signed the Chesapeake Bay Watershed Agreement, which contains 10 goals that will support the restoration and protection of the Bay watershed. The new agreement advances the work begun under previous Chesapeake Bay Program agreements and Executive Order 13508 by providing the opportunity for States and the Federal Government to recommit to their highest shared priorities.

In order to fulfill its mission and respond to regional stakeholder needs, the NOAA Chesapeake Bay Office is focused on the following commitments of the 2014 Chesapeake Bay Watershed Agreement:

- *Fisheries Management Goal:* NOAA is the Federal lead for interjurisdictional fisheries management, providing scientific support for decision-making and convening State fisheries managers around key resource issues.
- *Habitat Protection and Restoration Goal:* NOAA has identified the Choptank River watershed as a Habitat Focus Area, bringing coordinated funding and support to advance oyster and other habitat restoration efforts in the watershed.
- *Environmental Literacy Goal:* NOAA is the Federal lead for K-12 education in the Chesapeake Bay Program partnership, building capacity to support hands-on outdoor education and working to embed NOAA content in schools.
- *Climate Resiliency Goal:* NOAA is building a climate portfolio in the Chesapeake Bay, adding new sea level and inundation monitoring stations in developed areas working through NOAA's Chesapeake Bay Sentinel Site Cooperative and its partners to build community resiliency in response to environmental change.
- *Monitoring Principle:* NOAA maintains the Chesapeake Bay Interpretive Buoy System, an important monitoring system for understanding and predicting changes in the Bay ecosystem.



Oysters filter water, grow into reefs that provide needed habitat for a number of Bay species, and provide other ecosystem services.

Restoring Native Oysters

Restoring native oysters is a key component of restoring the Chesapeake Bay. The Chesapeake Bay Watershed Agreement calls for restoring oyster habitat and populations in 10 Bay tributaries by 2025. In FY 2013 and 2014, the NOAA Chesapeake Bay Office advanced oyster restoration through collaborative partnerships, targeting place-based projects in Maryland and Virginia, and applying habitat science to guide restoration.

NOAA led the creation and adoption of Bay-wide Chesapeake Bay oyster restoration metrics to develop a clear, common definition for such terms as “restored tributary” and “restored reef.” NOAA and partners also worked to select potential tributaries for restoration and began drafting oyster restoration blueprints for those tributaries.

In Maryland, NOAA chairs an oyster restoration workgroup with the U.S. Army Corps of Engineers (USACE), Maryland Department of Natural Resources, and the Oyster Recovery Partnership. This workgroup has selected three tributaries for restoration (Harris Creek, Little Choptank River, and Tred Avon River), and develops restoration blueprints for each. The Harris Creek blueprint calls for the restoration of 377 acres of oyster reefs in Harris Creek in Maryland, a project that is nearly complete. By the end of FY 2014, more than 260 acres of oyster reefs had been restored in Harris Creek. Additional acres were constructed with reef substrate and will be seeded with juvenile oysters in 2015. Following the Harris Creek model, reef construction started in FY 2014 in the Little Choptank River.

In Virginia, three tributaries have been selected for large-scale oyster restoration: the Lafayette, Lynnhaven, and Piankatank Rivers. NOAA and the USACE chair workgroups to develop restoration plans for each. Nonprofit organizations—including the Chesapeake Bay Foundation, Elizabeth River Project, Oyster Reefkeepers of Virginia, Lynnhaven River Now, and The Nature Conservancy—have implemented reef restoration projects in these tributaries, some with NOAA funding. Additional key partners include the Virginia Marine Resources Commission, Virginia Institute of Marine Science, and the City of Norfolk.

Applying NOAA’s Expertise in Habitat Science to Guide Restoration.

The NOAA Chesapeake Bay Office also brings critical scientific expertise to the oyster restoration effort through acoustic seafloor mapping (using sonar technology to obtain information about the bottom of the Bay or rivers). NOAA Chesapeake Bay Office scientists apply acoustic remote sensing techniques using side-scan and multi-beam sonar to “image” the Bay bottom. They use this information to determine the structure and composition (sand, shell, mud, etc.) of the bottom and to create maps to show the areas within a tributary suitable for restoration. These maps are key to identifying sites to construct

NOAA's Choptank Complex Habitat Focus Area

Based on NOAA's long-term involvement with the Chesapeake Bay Program, the agency has learned that the most effective programs are those that directly engage and empower communities. On a national level, NOAA has similarly recognized the need to increase the sustainability and productivity of our fisheries by focusing on the habitat that fish need to spawn and grow, as well as protect the coastal resources on which our communities depend. In keeping with this philosophy, NOAA established the Habitat Blueprint, which designates Habitat Focus Areas (HFA) in regions across the Nation.

In 2014, NOAA announced the selection of the Choptank and Little Choptank River watershed in Maryland and Delaware as one of the HFAs where the agency will focus its resources to support habitat conservation and restoration work to achieve results within the next 3 to 5 years. Three factors drive the focused attention on the Choptank region: (1) the urgency associated with degraded environmental conditions, (2) the community's recognition of significant societal impacts resulting from those conditions, and (3) the desire to protect the significant investments of Federal, State, and nonprofit organizations in oyster and other habitat restoration efforts.

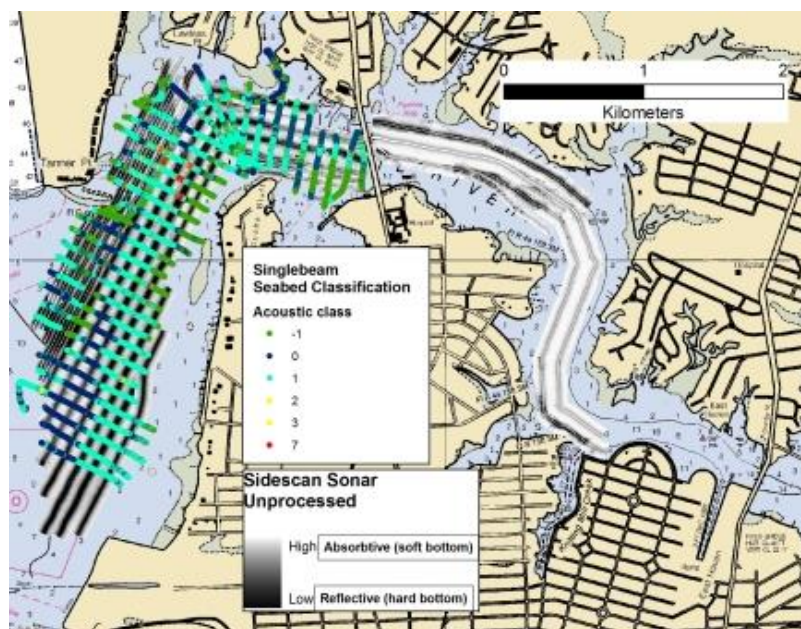
As such, the four goals of the HFA include: (1) habitat restoration and protection (oyster reefs, wetlands, and fish passage); (2) ecosystem services (ecosystem and societal benefits derived from the restored habitat); (3) integrating science for management (characterization, monitoring, and modeling); and (4) community engagement (K-12 education and community outreach).

NOAA is also linking this geographic focus to other Federal and State land-based conservation and protection programs in the area. These coordinated efforts will lead to more effective implementation and achievement of outcomes related to the 2014 Chesapeake Bay Watershed Agreement.

oyster reefs and serve as the foundation of the tributary restoration blueprint.

For example, in Harris Creek in Maryland, survival of juvenile oysters has increased by 100 percent. This remarkable improvement is attributable to better site selection, informed by NOAA's seafloor habitat mapping and assessment products.

In FY 2013 and 2014, the NOAA Chesapeake Bay Office also surveyed constructed reefs in the Lynnhaven River in Virginia and Harris Creek in Maryland to provide a basis for evaluating changes over time and determining the value of the newly created reefs.



NOAA Chesapeake Bay Office acoustic survey work on the Lafayette River in Virginia helps oyster restoration efforts target restorable bottom areas.

NOAA mapping accomplishments during the biennium include:

- Surveying the channels and approaches to the Cape May/Cape Henlopen ferry terminals after Superstorm Sandy to ensure that no navigational hazards would prevent resuming ferry operations.
- Surveying the Eastern Branch of the Elizabeth River and developing a restorable bottom analysis to guide the Elizabeth River Project's efforts to restore oysters there.
- Conducting additional surveys in the Lafayette River to refine the restorable bottom analysis created to assist oyster restoration efforts and to assess newly discovered reefs identified by the original acoustic surveys.
- Mapping the bottom of the Piankatank River in Virginia to support the development of a tributary plan for oyster restoration projects by The Nature Conservancy, the U.S. Army Corps of Engineers, and the Virginia Marine Resources Commission.

- Adding detailed acoustic surveys of the Little Choptank and Tred Avon River oyster sanctuaries for the development of the restoration blueprints in those rivers, both of which are part of the larger Choptank River complex.



Research conducted by NOAA Chesapeake Bay Office scientists and at other institutions funded by the NOAA Chesapeake Bay Office fisheries science program seeks to quantify the ecosystem services provided by oyster reefs.

Fisheries Science

By funding critical fisheries research, the NOAA Chesapeake Bay Office provides scientific and technical information to fisheries decision-makers that improve their ability to sustain ecologically and economically valuable Bay species. The NOAA Chesapeake Bay Office fosters the use of ecosystem-based approaches to management for the protection and restoration of oysters, blue crabs, menhaden, striped bass, shad, and herring and their habitats.

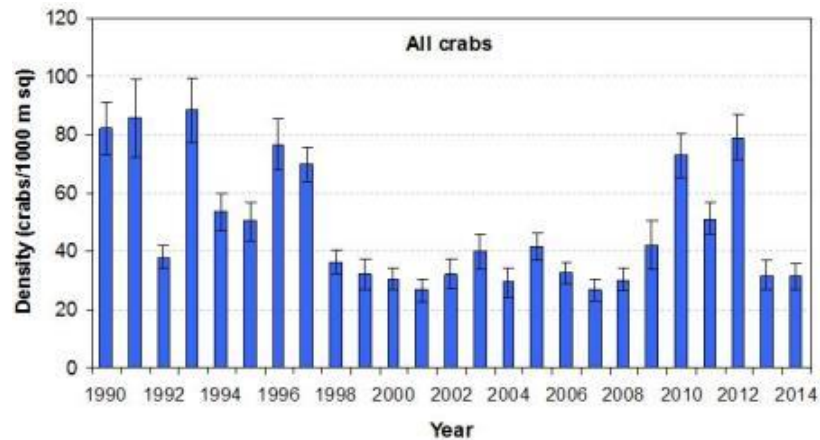
Facilitating and Coordinating Fisheries Management. The NOAA Chesapeake Bay Office chairs and leads the Chesapeake Bay Program’s Sustainable Fisheries Goal Implementation Team (Fisheries GIT). The Fisheries GIT provides the forum to draw together a diverse group of managers and scientists to improve management and recovery of commercially and recreationally valuable species. It focuses on advancing ecosystem-based fisheries management by using science to inform decisions by State and regional managers.

The Fisheries GIT works to ensure sustainable Chesapeake Bay fish populations, which support viable recreational and commercial fisheries. Institutions represented on the Fisheries GIT include the Virginia Marine Resources Commission, Maryland Department of Natural Resources, Potomac River Fisheries Commission, Atlantic States Marine Fisheries Commission, and District of Columbia Division of Fish and Wildlife.

Over the past 2 years, the Fisheries GIT developed the Sustainable Fisheries goal and related outcomes of the Chesapeake Bay Watershed Agreement relating to blue crab abundance and management, oyster restoration, forage fish, and fish habitat.

The NOAA Chesapeake Bay Office provides funding for a Chesapeake Bay Blue Crab Stock Assessment that is completed roughly every 5 years, the results of which are used to manage the blue crab fishery. In addition, the Chesapeake Bay Stock Assessment Committee (CBSAC) makes annual harvest recommendations in their Blue Crab Advisory Report that have been followed by Bay jurisdictions. Fishery managers recently implemented a 10 percent reduction in the blue crab harvest due to a decline in the population of adult female blue crabs. With assistance from the NOAA Chesapeake Bay Office, CBSAC completed and published the 2014 *Blue Crab Advisory Report*, which included a detailed description of the results from the Winter Dredge Survey, the primary tool for monitoring the abundance of blue crabs each year. Approximately 68.5 million female adult crabs were estimated to be in the Bay at the start of the 2014 crabbing season. This number is below

the recommended target population levels and was lower than the number of crabs observed in 2012 and 2013.



Data from the Winter Dredge Survey, conducted by Maryland and Virginia, is analyzed by scientists who compile the annual Blue Crab Advisory Report. NOAA Chesapeake Bay Office experts play important roles in developing this report, which provides up-to-date science for resource managers in the Bay jurisdictions that manage blue crabs.

CBSAC also recommended that fishery managers consider and evaluate a July-to-July management season, which will provide for the timely inclusion of the annual Winter Dredge Survey results from the same year into annual regulatory discussions. Virginia adopted this recommendation in June 2014.

The NOAA Chesapeake Bay Office, working with other NMFS scientists and researchers at the Virginia Institute of Marine Science, started a modeling project to understand the connection between summer flounder production and inshore habitats used by flounder (e.g., underwater grasses and marsh). In addition, modelers developed an oyster reef ecosystem model to estimate fisheries production improvement associated with oyster restoration. Both models are important steps in identifying habitat areas that support fisheries productivity and can lead to improved management of these critical habitats.

Supporting Management Decisions by Providing Sound Science. The NOAA Chesapeake Bay Office works with fishery managers and scientists to identify and target research priorities that support living marine resource management. During the biennium, the NOAA Chesapeake Bay Office supported fisheries research projects by awarding \$1.2 million in 11 grants to researchers in Maryland and Virginia. These projects are investigating the ecosystem services provided by restored oyster reefs, such as the sequestration of nitrogen and increase in fish abundance.

In addition to these new grants, the NOAA Chesapeake Bay Office funded several projects in previous years that yielded results during the biennium. For example, a collaborative of scientists at the Virginia Institute of Marine Science, Maryland Department of Natural Resources,

University of Maryland, and others completed a Bay-wide population assessment for oysters that will help guide restoration and fishery management decisions. Another project conducted by Virginia Commonwealth University found that invasive blue catfish are consuming large numbers of blue crabs and menhaden in portions of the James River, suggesting that fisheries managers may need to develop strategies to reduce invasive catfish populations.

The findings from this research will improve understanding of these species and the changes in the Bay affecting their health and sustainability. This will provide new information for Bay restoration efforts, the regional seafood industry, and recreational fishermen. Fishery managers in Virginia and Maryland will also use the results from this research as they make key management decisions about these species.

Chesapeake Bay Interpretive Buoy System

The Chesapeake Bay Interpretive Buoy System (CBIBS) is a network of 10 observing platforms that provide near real-time data on the Bay's meteorological, oceanographic, and water-quality conditions. CBIBS data are available at www.buoybay.noaa.gov, via a toll-free phone number (877-BUOY-BAY), and on mobile applications. Updated free mobile apps were introduced during the biennium for Android and iPhone, and a new app was made available for iPad. CBIBS data is used by a variety of agencies and constituencies, including the National Weather Service (providing improved marine forecasts), the U.S. Coast Guard (making operational decisions on appropriate gear for different Bay conditions), harbor pilots (considering winds, waves, and currents for their work), and scientists (assessing the health of the Bay using a broad array of ecosystem conditions). CBIBS data are also relied on by recreational boaters operating vessels from kayaks to sailboats to large motorboats as they make plans for a safe day on the Bay.

Use of CBIBS data increased; in FY 2013 and FY 2014 there were:

- 6,340 downloads of the CBIBS app to iPhones and iPads.
- 9,340 users of the CBIBS app for Android devices.
- 224,138 visits to www.buoybay.noaa.gov, including more than 76,000 unique visitors.
- 33,000 phone calls placed to the toll-free number.
- 8,310 visits (a record) to the website on a single day during Superstorm Sandy (October 29, 2012).

Strengthening Buoy Observations. In October 2013, Virginia Commonwealth University's (VCU) Rice Center launched a "smart buoy" in the James River near Charles City, Virginia, which now also contributes data directly to the NOAA CBIBS network. The VCU buoy is the first contributor to CBIBS to be purchased, deployed, and



NOAA Chesapeake Bay Office technicians make sure accurate data is available from CBIBS locations by keeping the buoys well maintained.

maintained by a university partner and was conducted as part of the CBIBS relationship with the Mid-Atlantic Regional Association Coastal Ocean Observing System (MARACOOS). This buoy features the typical CBIBS suite of sensors that measure meteorological and water-quality parameters, as well as new acoustic telemetry technology that allows researchers to track fish movement in real time. The technology, which tracks acoustic transmitters placed in fish, will provide a better understanding of migration and spawning behaviors in Atlantic sturgeon, striped bass, and other species.

Real-time acoustic fish tag tracking receivers, first tested on CBIBS buoys in 2011, are now in place on seven buoys. CBIBS fish tracking efforts led to the creation of the Mid-Atlantic Acoustic Telemetry Observation System, funded by NOAA and the Atlantic States Marine Fisheries Commission, to support marine animal behavioral studies. The NOAA Chesapeake Bay Office is currently working with other fish-tagging partners in the Bay—such as the Smithsonian Environmental Research Center and the U.S. Navy—to compile the various data sets in order to create a more robust sensor array database.

Over the past 2 years, some of the CBIBS buoys were equipped with additional oceanographic sensors. A nitrate sensor was added to the Susquehanna buoy to



The CBIBS Gooses Reef bottom water-quality sensor tracks parameters including dissolved oxygen nearly 40 feet below the surface.

better quantify the flow of nutrients from the largest single source of freshwater entering the Chesapeake Bay. NOAA continued to improve the data delivery from the Gooses Reef buoy, which has a real-time bottom-mounted water-quality sensor in addition to its surface water-quality sensor. This allows scientists to monitor a variety of water-quality factors below the surface and to track hypoxia events in the main stem of the Bay. Analysis of the data from dissolved oxygen tracked by the bottom sensor at Gooses Reef helped explain why many fishermen targeted areas near the buoy, as dissolved oxygen there remained sufficient for fish and crabs for much of the summer of 2014.

Providing Scientific Support. Significant crab mortality over the winter may be a factor affecting blue crab abundance and recovery in the Bay. CBIBS observed lower water temperatures from February to March 2014 in comparison to previous years. While the buoys measure water temperature at the surface, this overall persistence of colder water could be part of the puzzle for explaining winter die-off of mature female blue crabs in the upper Bay.

The NOAA Chesapeake Bay Office continued outreach efforts designed to increase the number of people using CBIBS data. In particular, staff conducted workshops for fishermen—many organized in concert with recreational fishing groups—to inform them how to access and use CBIBS data to enhance their fishing experiences. The “how-to”—combined with discussion of how Bay water characteristics (dissolved oxygen, water temperature, and salinity) can affect fish movements around the Bay—made many fishermen realize that CBIBS can be a good tool to use for targeting their efforts.

Other outreach resulted in new constituencies becoming devoted users of CBIBS data. Educators, scientists, commercial fishermen, and racing sailors are among those who were eager to share how they use CBIBS in the buoy system website’s “Featured User” highlight section. In particular, representatives from these constituencies who boat on the Bay highlighted that they check conditions via the buoys before they leave the dock to make sure it’s a safe day for them and their boats.

Additional content posted on the website included analysis of CBIBS data and graphs, highlighting scientific use of CBIBS data and describing how water conditions—like temperature and dissolved oxygen—can affect how fish choose their habitat.

The CBIBS website www.buoybay.noaa.gov also continues to receive impressive traffic during severe weather events, notably during Superstorm Sandy on October 28–30, 2012, and the derecho earlier that year on June 12–13.

Advancing Work through Partnerships. Through a continuing partnership of the NOAA Chesapeake Bay Office, National Park Service, and Chesapeake Conservancy, the CBIBS buoys mark and interpret the Captain John Smith Chesapeake National Historic Trail, the first water trail in the National Historic Trail System. In FY 2013 and 2014, as part of the War of 1812 bicentennial, the buoys were used to help interpret the new Star-Spangled Banner National Historic Trail.

During the biennium, CBIBS established a formal agreement with MARACOOS, the regional component of the U.S. Integrated Ocean and Coastal Observing System. MARACOOS supported the integration and launch of the VCU buoy and will work collaboratively with the CBIBS team to make improvements in data quality control and the management and development of new CBIBS sensors, systems, and applications.



CBIBS “Featured User” profiles show how people—including this commercial waterman—use CBIBS data.



Education programs supported and implemented by NOAA Chesapeake Bay Office experts give educators around the Bay watershed access to NOAA science.

Environmental Literacy

The NOAA Chesapeake Bay Office supports a range of educational policies and programs that increase awareness, build knowledge, and facilitate productive and lasting citizen involvement in the stewardship of the Chesapeake Bay watershed.

Graduating Environmentally Literate Students. The mid-Atlantic is home to the Nation's most advanced regional effort to embed environmental education into K-12 schools. Since 2002, NOAA has been a driving force behind a coordinated regional approach to environmental education and has worked to advance policies, partnerships, and programs at all levels. In the biennium, NOAA led the development of the Environmental Literacy goal and outcomes of the Chesapeake Bay Watershed Agreement. This effort ensured that the relevant Federal priorities identified in the Mid-Atlantic Elementary and Secondary Environmental Literacy Strategy were formally committed to by State partners. These priorities included teacher-supported student outdoor learning experiences, sustainable schools, and environmental literacy planning.

In support of this initiative, NOAA worked with partners to update the definition of the Meaningful Watershed Educational Experience (MWEE), which serves as the basis of the NOAA Bay Watershed Education and Training (B-WET) Program and environmental education funding partners, such as the Chesapeake Bay Trust. The new MWEE definition has a new emphasis on student action to increase stewardship of the Bay watershed, an important goal of the Chesapeake Bay Watershed Agreement. NOAA also worked with professional evaluators and education partners to develop and pilot a set of environmental literacy metrics for school systems in the region. Once implemented in 2015, the Chesapeake Bay Program should have a baseline understanding of environmental literacy policies and programs in place for the three million students in the watershed. This baseline data from the metrics will inform where NOAA and other environmental education funding partners will target resources to more effectively meet State and local needs and priorities.

Creating Model School Systems throughout the Region. At the heart of creating and sustaining the regional vision for student environmental literacy are school systems that provide consistent and ongoing environmental education for all students. In FY 2013 and 2014, the NOAA B-WET Chesapeake Program awarded 23 new grants and 13 continuing awards to develop and implement MWEEs that incorporate NOAA science and resources into school division plans. These awards will reach 90,000 students and 2,000 teachers over two years, bringing the total that NOAA has served since 2002 to approximately 500,000 students and 18,000 teachers. B-WET continued its financial support for model, systemic programs across the watershed. Programs such as those in Virginia Beach City Public Schools and Montgomery County Public

Schools serve as models for other school divisions who are creating comprehensive environmental literacy programs in partnership with a broad range of public and private entities. In Virginia Beach, for example, Chesapeake Bay Foundation, a B-WET grant recipient, is supporting MWEs for all sixth graders in Virginia Beach public schools while simultaneously working to integrate MWEs into the school system curriculum so the benefits of these experiences will continue long after the grant ends.



Meaningful Watershed Educational Experiences serve as the basis of the NOAA Bay Watershed Education and Training (B-WET) Program.

B-WET Chesapeake also serves as a test bed for piloting and advancing national initiatives of the NOAA Office of Education. FY 2013 and 2014 B-WET funding announcements

were coordinated with the NOAA Office of Education to include priorities such as increasing geographic literacy; expanding models of environmental science, technology, engineering, and math (STEM) education for urban students; and promoting the use of the Global Learning and Observations to Benefit the Environment Program in watershed education. This allows NOAA to pilot and evaluate projects on a regional or local level and identify conditions necessary for successful implementation in other regions or at a national scale.

Putting Cutting-Edge Science in the Hands of Educators. The Chesapeake Bay region enjoys a tremendous number of community partners committed to providing environmental education to students at schools, environmental centers, and natural areas. This cadre of non-formal educators has limited opportunities for professional development, but plays a pivotal role in environmental education. The NOAA Environmental Science Training Center in Oxford, Maryland, offers training and in-depth experiences to advance the abilities of non-formal educators to convey the latest information on STEM to teachers and students. During the biennium, the Center offered eight rigorous, multiday workshops on climate change, weather, education, and conservation in a changing Bay; the importance of keystone species; and the new NOAA Chesapeake Exploration curriculum—an innovative online high school curriculum that uses real-time data from CBIBS. More than 250 participants in these workshops have used the content and materials provided by the NOAA Chesapeake Bay Office to create both professional development programs for teachers and educational programs for students that explore complex environmental science topics.



The NOAA Chesapeake Bay Office will continue to provide science, service, and stewardship to protect and restore the Bay.

Looking Forward

NOAA will continue work to advance the Chesapeake Bay Watershed Agreement, including leading the development of Chesapeake Bay Program management strategies for sustainable fisheries and environmental literacy and actively engaging in the development of strategies for climate and habitat outcomes of the Bay Agreement. As part of the implementation of these strategies, the NOAA Chesapeake Bay Office will:

- Support the comprehensive 2016 Blue Crab Stock Assessment to guide management decisions that support the Chesapeake Bay Watershed Agreement outcome of maintaining a sustainable blue crab population as well as a stable and productive crab fishery.
- Develop oyster restoration plans for two Virginia tributaries. This will advance the Chesapeake Bay Watershed Agreement outcome of restoring native oyster habitat and populations in 10 tributaries by 2025.
- Convene the 2015 Environmental Literacy Summit to advance State and Federal efforts, consistent with the Chesapeake Bay Watershed Agreement Environmental Literacy Planning Strategy, to create and support environmental literacy programs, policies, and metrics for all students in the region.
- Expand NOAA's Chesapeake Bay Sentinel Site Cooperative, a coastal monitoring and data collection network in the Chesapeake Bay, to advance the Bay Agreement outcome of monitoring and assessing trends and likely effects of changing climatic and sea level conditions on the Bay ecosystem.

NOAA will also continue habitat restoration and community engagement work in the Choptank watershed in support of the NOAA Habitat Focus Area. Specifically, the NOAA Chesapeake Bay Office will:

- Complete oyster restoration in Harris Creek and begin reef construction in the Tred Avon River. These actions will also support the Chesapeake Bay Watershed Agreement outcome on oyster restoration.
- Release a community engagement assessment of the Choptank watershed to guide future restoration activities.

Budget

The following table presents NOAA Chesapeake Bay Office's appropriations history from FY 2011 to FY 2014.

NOAA Chesapeake Bay Office Recent Appropriations History (dollars in thousands)

National Marine Fisheries Service OPERATIONS, RESEARCH, AND FACILITIES	FY 2011	FY 2012	FY 2013	FY 2014
OTHER ACTIVITIES SUPPORTING FISHERIES REGIONAL STUDIES Chesapeake Bay Studiesⁱ	\$7,105	\$5,072	\$4,723	\$5,067
FISHERIES RESEARCH AND MANAGEMENT SURVEY AND MONITORING PROJECTS Chesapeake Bay Multi-Species Management	\$494	\$425	\$400	\$401
Oyster Restoration in Maryland	\$1,000	--		
Education (B-WET)	\$1,618	\$2,168	\$2,450	\$2,743
Total	\$10,217	\$7,665	\$7,573	\$8,211

ⁱThe Regional Studies/Chesapeake Bay Studies line was increased in FY 2011 as a result of the Chesapeake Bay Executive Order, and funding from this line was used to support CBIBS starting in FY 2011 and oyster restoration from FY 2012 to FY 2014.

For more detailed information on the work of the NOAA Chesapeake Bay Office, visit: www.chesapeakebay.noaa.gov