



NOAA FISHERIES

A Few Highlights from the Biennium

- **205 acres.** The amount of oyster reef restoration work supported by NOAA Chesapeake Bay Office funding.
- **\$2.1 million.** The grant funding provided by the Bay Office to researchers trying to answer critical scientific questions about key recreational and commercial fish in the Chesapeake Bay.
- **22.3 square nautical miles.** The amount of bottom habitat surveyed and evaluated by the Bay Office for potential oyster habitat restoration sites.
- **65,000 students and 2,750 teachers** experienced hands-on environmental science education as a result of Bay Watershed Education and Training (B-WET) funding.
- **10 buoys** make up the “backbone” of the completed Chesapeake Bay Interpretive Buoy System.
- **25 percent.** That’s how much more efficient the Bay Office’s survey operations are as a result of the new vessel, the R/V *Potawaug*.

NOAA Chesapeake Bay Office Biennial Report to Congress Fiscal Years 2011–2012

This report describes the activities of the NOAA Chesapeake Bay Office for fiscal year (FY) 2011 and 2012 under the NOAA Authorization Act, 15 U.S.C. 1511d. This report fulfills the Congressional requirement in Sec. 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.

NOAA’s mission is to understand and predict changes in the Earth’s environment, from the depths of the ocean to the surface of the sun, and to conserve and manage our coastal and marine resources. In applying this mission to North America’s largest estuary, NOAA has achieved significant advances in science, service, and stewardship to address the challenges facing the Chesapeake Bay, including the human-induced effects of degraded water quality, overharvesting of fisheries, and habitat destruction.

NOAA has been a partner in Chesapeake Bay Program restoration and protection efforts since 1984. The NOAA Chesapeake Bay Office was established in 1992 and is a division of the National Marine Fisheries Service Office of Habitat Conservation, which works to protect and restore coastal and marine habitat at the national level. The Bay Office is also a key collaborator with NOAA’s North Atlantic Regional Team, which integrates NOAA’s program activities to address priorities at both the national and regional scale.

In 2009, Executive Order 13508 for Chesapeake Bay Protection and Restoration ushered in a new era of shared federal leadership. This solidified NOAA’s responsibility to the region and established specific commitments as



The President’s Executive Order on Protection and Restoration of the Chesapeake Bay terms the Bay a “national treasure.”

part of a comprehensive strategy. On behalf of NOAA, the Bay Office has leadership responsibilities related to interjurisdictional fisheries management and environmental literacy, as well as supporting NOAA's membership in the Federal Leadership Committee. The accomplishments outlined in this report describe many aspects of NOAA's implementation of the Executive Order.

This report summarizes the Bay Office's activities for FY 2011–2012 (the biennium) in the areas of oyster restoration, fisheries science, the Chesapeake Bay Interpretive Buoy System, and environmental science education.

Restoring Native Oysters

Restoring native oysters is a key component of restoring the Chesapeake Bay. The Chesapeake Bay Executive Order strategy calls for restoring oysters in 20 Bay tributaries by 2025. In FY 2011 and 2012, the Bay Office advanced oyster restoration through collaborative partnerships, targeting place-based projects in Maryland and Virginia and applying NOAA's expertise in habitat science to guide restoration.

Collaborative tributary-scale oyster restoration. The first step to restoring oyster populations in 20 tributaries by 2025 was to develop a clear, common definition for terms such as “restored tributary” and “restored reef.” NOAA chaired a workgroup of state, federal, and academic partners involved in oyster restoration in the Chesapeake Bay to produce a report detailing a new, scientific, consensus-based set of metrics for how to measure oyster restoration success. With this new basis for evaluation, all agencies and efforts can move forward with a common understanding and framework for large-scale oyster restoration in selected tributaries.

Following the oyster metrics report, NOAA worked with state and federal agencies in Maryland and Virginia to select priority tributaries for restoration. In Maryland, Harris Creek and the Little Choptank River were selected and in Virginia the Lafayette River (a branch of the Elizabeth River) and Lynnhaven River were targeted.

Further applying the oyster metrics, NOAA, the U.S. Army Corps of Engineers, and the Maryland Department of Natural Resources drafted a more detailed blueprint to restore Harris Creek. To date, NOAA and partners have constructed 80 new acres of oyster reef and planted spat on shell on an additional 60 acres in this tributary.



Among other benefits, oysters provide habitat and water filtration services.

Restoration is also underway in Virginia, with NOAA funding the placement of 200 reef balls and the creation of a new oyster reef in the Lafayette River. The Bay Office also provided funding to the Virginia Marine Resources Commission



R/V Potawaugh

In 2012, the Bay Office acquired a new 32-foot catamaran survey vessel, the R/V *Potawaugh*—named for the Algonquin Indian term for “porpoise,” a mammal which, like the new vessel, uses echo-location to sense the environment. With this vessel, NOAA scientists can operate the full suite of habitat mapping and characterization sensors (multibeam sonar, side-scan sonar, seismic sonar, etc.) simultaneously, increasing the efficiency with which NOAA can map future oyster restoration sites. In addition, the *Potawaugh* is used as a platform for operating a remotely operated vehicle (ROV), deploying oceanographic sensors, and video surveying.

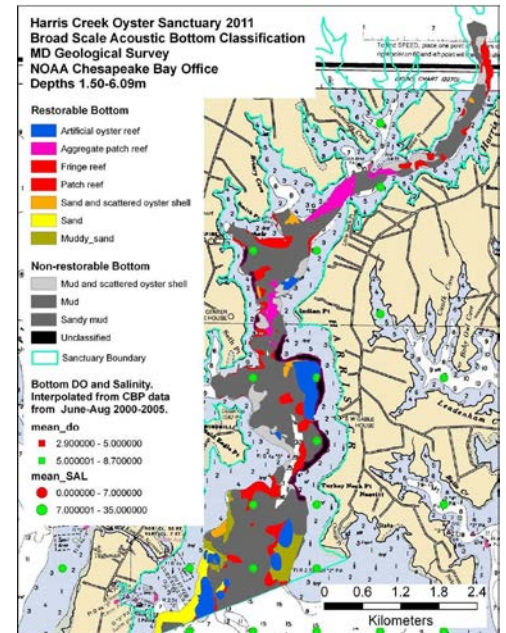
Data from the *Potawaugh* is leading to better decisions about siting oyster restoration projects, identifying habitat areas needed by fish species, and assessing marine debris, including derelict fishing gear.

to acquire 20,000 bushels of oyster shell to enhance a 28-acre oyster reef/sanctuary in the James River in Virginia.

Applying NOAA’s expertise in habitat science to guide restoration.

The 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). 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 what areas within a tributary are suitable for restoration. These maps are key to identifying sites to construct oyster reefs and serve as the foundation of the tributary restoration blueprint. The Bay Office also surveys constructed reefs to provide a basis for evaluating changes over time. NOAA mapping accomplishments include:

- Delineated Maryland oyster sanctuaries in Eastern Bay, Prospect Bay, Miles River, Wye River, Harris Creek, and parts of Chester River; processed survey data; and provided an analysis of the amount of restorable bottom to guide future oyster restoration efforts in those sanctuaries.
- Mapped the bottom of the Lafayette River in Norfolk, Virginia, and created an analysis of the amount of restorable bottom in the river to guide future oyster restoration efforts there.
- Surveyed oyster reef restoration sites in the Choptank and lower Chester rivers in Maryland and delivered processed data and mapping products to the U.S. Army Corps of Engineers and the Chesapeake Bay Foundation to support their restoration efforts. This survey data was also provided to the NOAA Office of Coast Survey, who used the data to update nautical charts in those rivers.
- Resurveyed oyster restoration sites in the Great Wicomico and Piankatank rivers in Virginia and will provide processed data and mapping products to restoration partners.
- Conducted post-construction surveys for oyster reef projects in Harris Creek to provide the data to several restoration partners who are conducting studies on the shape and structure of oyster reefs.



Bay Office mapping capabilities helped create this visualization of areas where oysters could be restored in Harris Creek. These products are key to supporting state and federal partners’ restoration efforts.

In addition, the Bay Office provided funding for a first-of-its-kind, Bay-wide oyster stock assessment to estimate oyster abundance to guide restoration and fishery management efforts. In a separate project, the Bay Office supported research on the nitrogen removal potential of oysters (turning organic nitrogen into nitrogen gas released to the atmosphere). Regulators need this information as they consider nitrogen trading programs as a way to reduce water pollution.

Fisheries Science

By funding critical fisheries research, the Bay Office provides scientific and technical information to fisheries decision makers that improve their ability to sustain ecologically and economically valuable Bay species. The 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 fisheries management. The 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 oysters, blue crab, menhaden, striped bass, shad, herring, and alewife. It focuses on advancing ecosystem-based fisheries management by using science to inform fishery management decisions by state and federal bodies.



The Bay Office supported funding of the 2011 Blue Crab Stock Assessment, a comprehensive look at the health of the blue crab population in the Chesapeake Bay.

The Fisheries GIT works to ensure sustainable Chesapeake Bay fish populations, which support 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.

The Fisheries GIT also promotes an ecosystem-based approach to fisheries management, including consideration of the fishery food webs and the benefits of certain fish species for ecosystem services. Over the past 2 years, the Fisheries GIT established a Bay-wide policy for mitigating impacts of invasive catfish, approved the first-ever oyster restoration metrics, and worked to better link land use and fishery management sectors to improve fish production and health.

In addition, the Fisheries GIT established new female blue crab conservation and harvest targets, as a result of the NOAA-supported 2011 Blue Crab Stock Assessment. This was the first comprehensive assessment on the population since 2005 and confirmed that Chesapeake Bay blue crabs are becoming more abundant, based in large part on the management efforts put in place in recent years by Maryland and Virginia. The assessment also provided important new data for state officials to consider as they continue to fully rebuild the regional stock of this iconic Bay species.

Sound science to support management decisions. The Bay Office works with fishery managers and scientists to identify and target research priorities that support living resource decision making. During the biennium, the Bay Office supported fisheries research projects by awarding \$2 million in 17 grants to researchers in Maryland and Virginia designed to answer questions about key species such as oysters, blue crabs, striped bass, soft-shell clams, cow nosed rays, and blue catfish. The findings from this research will improve our 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.



The Bay Office conducts and funds needed fisheries research on critical topics facing the Bay.

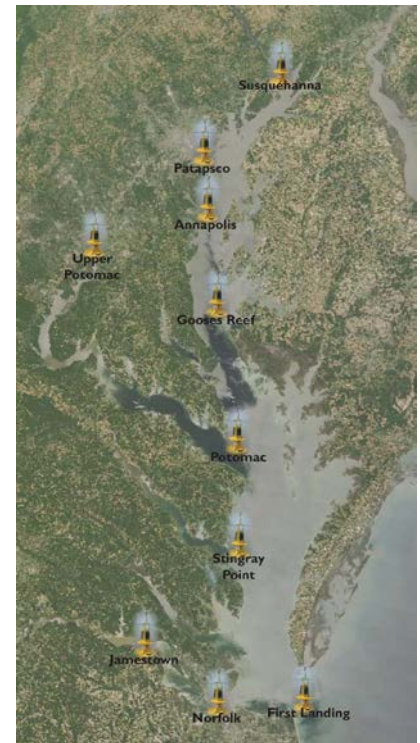
During the biennium, the Bay Office supported menhaden research through a partnership with the Atlantic States Marine Fisheries Commission and initiated the first runs of the Chesapeake Bay Atlantis model, simulating the ecological effects of blue catfish on key species such as shad and herring. These results will help determine the impact of blue catfish and how much additional effort may be needed to manage them.

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, and on mobile applications. It 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 of appropriate gear for different Bay conditions), harbor pilots (who consider winds, waves, and currents for their work), and scientists (for a broad array of ecosystem conditions that assess the health of the Bay).

Strengthening buoy observations.

In August 2011, the Bay Office deployed the 10th CBIBS buoy near the mouth of the Chesapeake Bay, completing the observational “backbone” of the system. During the biennium, the Bay Office also tested new sensors on several CBIBS buoys, including a nitrate (nitrogen) sensor on Susquehanna buoy, a bottom sensor that measures dissolved oxygen below the Gooses Reef buoy, and fish tag receivers on the James River buoy to track the movements of endangered Atlantic sturgeon.



The NOAA Chesapeake Bay Interpretive Buoy System tracks data at 10 “backbone” locations around the Bay.

Working with partners. Through a continuing partnership between the Bay Office, the National Park Service, and the 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 2012, as part of the War of 1812 bicentennial, the buoys were used to help interpret the new Star Spangled Banner Trail.

Providing scientific support. Beginning in 2011, NOAA and a variety of partners launched a Bay-wide effort known as the Chesapeake Bay Sentinel Site Cooperative to monitor the effects of sea level change. In a separate project, following Hurricane Irene and Tropical Storm Lee, the Bay Office participated in a post-storm assessment that used CBIBS and other observations to track a sediment plume caused by the storms' heavy rainfall.

During the biennium, CBIBS was also used to validate hydrodynamic models and remote sensing data from satellites. These efforts leverage NOAA's remote sensing capabilities to examine a broad range of ecosystem conditions, ultimately providing a diagnosis of ecological health. Beginning in 2011,

scientists combined CBIBS observations and satellite data to create a sea nettle forecast for Bay swimmers during the summer months.

Environmental Science Education

NOAA supports a range of educational programming that increases awareness, builds knowledge, and facilitates productive and lasting citizen involvement in stewardship of the Chesapeake Bay watershed.

Graduating environmentally literate students. The Mid-Atlantic is home to the Nation's most advanced effort to embed environmental education into schools throughout the Chesapeake Bay watershed. Since 2002, NOAA has been a driving force behind a coordinated regional approach to environmental science education and has worked to advance policies, partnerships, and programs at all levels. In the biennium, NOAA took on a new role as lead for K-12 education in support of the Executive Order with the release of the Mid-Atlantic Elementary and Secondary Environmental Literacy Strategy on behalf of the federal government. The Strategy coordinates federal resources in support of state environmental education efforts and establishes a set of shared priorities for Chesapeake Bay Program partners. NOAA convened two regional coordination workshops: the biennial Environmental Literacy Summit in November 2011 that focused on ensuring that national priorities (the National Ocean Policy, America's Great Outdoors, and Next Generation Science Standards) are well represented in the region; and a best practices



The Bay Office's Environmental Science Training Center delivers the most up-to-date science to educators to use with students.

workshop in August 2012 to refine the Chesapeake Bay Program's meaningful watershed educational experience (MWEE) using new research and to create new metrics to better capture the work of the states in support of the MWEE.

Creating model school systems throughout the region. At the heart of creating and sustaining the regional vision for student environmental literacy are school divisions that provide environmental education for all students every year. In FY 2011–2012, the NOAA Bay Watershed Education and Training (B-WET) Program awarded 11 new grants and provided ongoing technical assistance to 19 continuing awards to develop and implement MWEEs that incorporate NOAA science and resources into school division plans. These awards will reach 65,000 students and 2,750 teachers over 2 years, bringing the total that NOAA has reached since 2002 to approximately 425,000 students and 16,000 teachers. In addition, the Bay Office supported two additional large scale model programs in Virginia Beach Public Schools in

partnership with the Chesapeake Bay Foundation and in Anne Arundel County Public Schools in partnership with Annapolis Maritime Museum. These exemplary public-private partnerships encourage ownership of the programs from a broad range of constituents and promote long-term sustainability in school divisions. They also serve as blueprints for other school divisions who are creating comprehensive environmental literacy programs.

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. In the fall of 2011, the Bay Office launched the NOAA Environmental Science Training Center to offer training and in-depth experiences to advance the abilities of non-formal educators to convey the latest information on science, technology, engineering, and math (STEM) to teachers and students. During the biennium, the Center offered rigorous, multiday workshops on climate change and the importance of keystone species as well as training on the new NOAA Chesapeake Exploration curriculum, which is an innovative online high school curriculum that uses real-time data from CBIBS. Participants in these workshops have used the content and materials provided by the Bay Office to create both professional development programs for teachers and educational programs for students that thoughtfully explore complex topics, such as climate change.

Looking Forward

NOAA is committed to achieving the outcomes outlined in the President's Executive Order Strategy for Chesapeake Bay Protection and Restoration and advancing the NOAA Habitat Blueprint. In the FY 2013 Action Plan, NOAA outlines several key actions that we will accomplish with partners:

- Implement the NOAA Habitat Blueprint by working across NOAA programs and with external partner organizations to address the growing challenge of habitat loss and degradation.
- Continue tributary-scale oyster restoration in Harris Creek, with a goal of restoring 300 acres, or half of the "restorable bottom" in that creek. This will be the largest restoration project of its kind in the Bay.
- Monitor the impact of sea level rise at "sentinel sites" throughout the Bay. Data collected at these sites will help coastal managers adapt to rising sea levels.
- Establish a conservation threshold and management target for male blue crabs, which will help ensure sustainability of the blue crab harvest and population.
- Improve our understanding of fisheries status and trends and deliver this science to fisheries managers for better decision making.
- Integrate acoustic seafloor mapping products with results of oyster surveys to help partners identify the best locations and designs for oyster reef restoration.
- Apply the Chesapeake Atlantis fisheries model to interpret and predict the relationship between habitat and fisheries.

- Implement a new environmental science education initiative targeted at urban schools.
- Integrate CBIBS water quality data with Maryland and Virginia's shallow water monitoring systems, increasing the number of stations tracking water pollution in the Bay and its tributaries. This data will be used by the Environmental Protection Agency to evaluate compliance with the Clean Water Act, a key component in protecting and restoring the Bay.

Budget

The following table presents NCBO's Appropriations History from FY 2009 to FY 2012. Overall total funding has decreased significantly since FY 2009 in large part due to decreases in congressionally directed funding. Before FY 2011, NCBO was provided congressionally directed funding to support its core work. In FY 2011, there was a significant increase in the base funding line of Regional Studies-Chesapeake Bay Studies to support priority activities for implementing the Chesapeake Bay Executive Order.

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

NOAA Chesapeake Bay Office Appropriations History (dollars in thousands)

National Marine Fisheries Service OPERATIONS, RESEARCH, AND FACILITIES (ORF)	FY 09 Enacted	FY 10 Enacted	FY 11 Enacted	FY 12 Enacted
OTHER ACTIVITIES SUPPORTING FISHERIES REGIONAL STUDIES Chesapeake Bay Studiesⁱ	\$2,950	\$2,085	\$7,105	\$5,072
FISHERIES RESEARCH AND MANAGEMENT SURVEY AND MONITORING PROJECTS Chesapeake Bay Multi-Species Management	--	\$495	\$494	\$425
Congressionally Directed funding:				
Oyster Restoration MD	\$2,600	\$2,000	\$1,000	--
Oyster Restoration VA	\$2,000	\$1,000	--	--
Blue Crab Advanced Research	\$50	--	--	--
Chesapeake Bay Blue Crab Research	\$550	--	--	--
Morgan State Oyster Pilot	\$500	\$200	--	--
VA Trawl Survey	\$150	\$300	--	--
Chesapeake Bay Interpretive Buoy System (CBIBS)	\$500	\$500	--	--
Education (B-WET)	\$3,300	\$3,500	\$1,618	\$2,168
Metagenomic Analysis of Chesapeake Bay	--	\$100	--	--
Chesapeake Bay Environmental Center	--	\$250	--	--
Oxford Lab (transfer from NOS to NCBO)ⁱⁱ	\$1,844	\$1,499	\$995	--
Total	\$14,444	\$11,929	\$11,212	\$7,665

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 and oyster restoration in FY 2011 and FY 2012.

ⁱⁱFunds for NCBO activities at Oxford have been rolled up in a National Ocean Service (NOS) budget line for Oxford, Maryland, since 2004.