NOAA FISHERIES

NOAA Chesapeake Bay Office

Biennial Report to Congress Fiscal Years 2021–2022

Introduction

This report describes the activities of the National Oceanic and Atmospheric Administration (NOAA) Chesapeake Bay Office for Fiscal Years 2021–2022 under the NOAA Authorization Act of 1992, 15 U.S.C. § 1511d as amended by Section 401(a) of Public Law 107-372. This Act established the NOAA Chesapeake Bay Office (NCBO), which is a division of the Office of Habitat Conservation within NOAA Fisheries.

NCBO uses its capabilities in science, restoration, and community engagement to improve the understanding, management, and stewardship of the Chesapeake Bay. In fiscal years (FY) 2021 and 2022, NCBO focused on sustainable fisheries science, oyster restoration, observations of Bay weather and water conditions, environmental literacy, and community partnerships.

NOAA has been a partner in the Chesapeake Bay Program since 1984. In 2014, NOAA and its federal and state partners signed the Chesapeake Bay Watershed Agreement, which included goals supporting the restoration and protection of the Bay watershed and guiding the work of the Chesapeake Bay Program. During FY 2021 and 2022, NCBO worked with partners to implement the goals of the Agreement and other shared priorities.

Highlights of NCBO's work during FY 2021 and 2022 are featured in this report.

An eroding marsh in Virginia; photo by CBNERR-Virginia

Implementing Large-Scale Oyster Restoration

Restoring oyster reef habitat in the world's largest oyster restoration project to improve ecological and economic conditions in the Chesapeake Bay

- Working with other agencies and organizations, NCBO completed oyster reef construction on the Tred Avon and St. Mary's Rivers in Maryland and on the Great Wicomico and Piankatank Rivers in Virginia. NOAA and partners planted more than 1 billion juvenile oysters onto Maryland reefs in 2021 and 2022. Partners have now completed oyster restoration work in seven of 10 rivers planned toward the Chesapeake Bay Program's goal to restore oyster reefs in 10 Chesapeake Bay tributaries by 2025. Reefs restored under this initiative now total more than 1,300 acres – an unprecedented scale globally. Monitoring results show that 99 percent of these reefs are meeting or exceeding established success metrics. These reefs are improving water quality and clarity, enhancing fish habitat, and generating jobs and income for surrounding communities.
- NCBO and partners monitor restored reefs to track their progress and health. Doing so at the scale required to track the world's largest oyster restoration project is a challenge. NCBO collaborates with partners to use divers or modified harvest gear to monitor biological characteristics of the reef and sonar equipment to track physical aspects. NCBO led the scientific and management community through the development and testing of a more efficient, cost-effective, video-based reef monitoring protocol that can replace some of the traditional monitoring.
- To grow understanding of the restoration process and the tremendous ecological and economic benefits provided by restored oyster reefs, NCBO collaborated with oyster restoration partners to increase outreach and communications about large-scale oyster restoration. The group developed videos, StoryMaps, events, and web content and worked with the media to share this information.

Continuing Activities

Restoration work will continue in three Chesapeake tributaries. Experts will research the potential for using oysters as shoreline protections and continue quantifying the value of nature-based infrastructure. The team will work with partners to pilot the rapid monitoring protocol in the Tred Avon and Manokin Rivers.

NCBO's field team monitors the health of restored oyster reefs; photo by NOAA Chesapeake Bay Office

Monitoring and Mapping Chesapeake Bay Conditions

Collecting and delivering environmental data to support scientific research, habitat restoration, natural resource management, and public safety

- NCBO's field team successfully piloted a new kind of buoy that monitors dissolved oxygen throughout the water column (from the surface of the water to the Bay bottom). These buoys will help NOAA and the Chesapeake Bay Program track how dissolved oxygen levels change at key points in the Bay through different seasons and years. Monitoring the volume and duration of the annual summertime "dead zone" provides insight into the area where animals including striped bass, oysters, and crabs can't live. In years with large dead zones, these animals are more stressed.
- NCBO partnered with state fisheries management agencies to deploy gates of fish tracking receivers at the mouth of the Chesapeake Bay in Virginia and near the Chesapeake Bay Bridge in Maryland. Using telemetry, these gates detect tagged fish, such as striped bass and Atlantic sturgeon, and increase understanding of when and where fish migrate and how they use the Bay. Coupled with satellite and buoy-based observations, telemetry data can provide insight into how fish are using different habitats under changing conditions.
- NCBO's buoy team maintained and operated the Chesapeake Bay Interpretive Buoy System (CBIBS). CBIBS buoys track weather and water conditions and share data publicly via website and mobile apps. This information is used by scientists, boaters, anglers, educators, and more. During the biennium, all of the system's aging buoys were replaced with a new, smaller but just as capable, buoy that will streamline operations and maintenance.
- NCBO scientists mapped sturgeon habitat to assess spawning habitat conditions in several Bay tributaries. NOAA conducted work in the Nanticoke River and Marshyhope Creek at the request of Maryland and Delaware natural resource management agencies. Using side-scan sonar, NOAA found rough, hard gravel or cobble bottom located in some bends of the rivers. Sturgeon prefer gravelly bottom for spawning, so these may be habitat areas needed by these Endangered Species Act–listed fish.

Continuing Activities

NCBO will maintain the Chesapeake Bay Interpretive Buoy System at up to eight locations throughout the Bay. The team will expand the hypoxia monitoring program to five to seven locations. NCBO will operate acoustic telemetry receivers at two gates across the Chesapeake Bay and on all CBIBS and hypoxia buoys. Fish detection data from these receivers will be shared in a database used by fisheries researchers.

A hypoxia buoy floats in the Chesapeake Bay; photo by NOAA Chesapeake Bay Office

Enabling Sustainable Fisheries and Habitat Science

Exploring the relationship between changing environmental conditions and commercially and recreationally important fish, shellfish, and their habitats to inform decision-making

- NCBO assumed work on a long-term fish monitoring project at the Paul S. Sarbanes Ecosystem Restoration Project at Poplar Island. The monitoring project, previously led by the NOAA Southeast Fisheries Science Center, measures how fish are responding to restoration efforts by tracking how they use areas in creeks and nearshore areas as habitat returns thanks to restoration of this Chesapeake Bay island.
- NCBO experts chair and coordinate the Chesapeake Bay Program's Sustainable Fisheries Goal Implementation Team, which brings together resource managers and scientists from around the watershed to discuss the most up-to-date fisheries science. This team coordinates the Chesapeake Bay Stock Assessment Committee, which develops the annual Blue Crab Advisory Report and, in 2022, organized and ran a science workshop to dive into reasons behind a downward trend in the Bay's blue crab population and led planning for a new blue crab benchmark stock assessment.
- NCBO produces seasonal summary reports – a new product developed during the biennium. The reports include graphs, maps, and other data to evaluate seasonal water temperature, salinity, and dissolved oxygen relative to longer-term averages. Scientists examine how anomalies in the observed measurements may affect important Bay species like blue crabs, striped bass, summer flounder, forage fish, oysters, and underwater grasses. The summaries are used by resource managers, like those at the Mid-Atlantic Fishery Management Council, to inform Ecosystem Approaches to Fisheries Management.
- NCBO provided more than $1 million to support fisheries research projects examining the socioeconomic effects of oyster restoration, submerged underwater grasses, and natural and restored shorelines in the Middle Peninsula of Virginia; development of rapid oyster reef monitoring protocol; fish species' response to climate change; and factors affecting summer flounder and striped bass abundance. Projects finalized during the biennium explored how black sea bass, summer flounder, and forage species use habitat in the Chesapeake and nearby Atlantic Ocean. These are valuable commercial and recreational species; understanding how climate change could affect them is key for fishery managers.

Continuing Activities

Monitoring at Poplar Island will continue, using traditional and new approaches such as acoustic telemetry to track fish movements. NCBO will continue to produce the seasonal summaries, including expanded data sources. NCBO will also explore ways to use the seasonal summaries in evaluating ecological risk for key living resources. The abundances of prey for predators will be tracked and Chesapeake Bay-specific estimates of striped bass will be developed. Data from telemetry receivers in the mainstem will be analyzed to understand fish movements into and within the Bay. A data workshop will be conducted to support the blue crab benchmark stock assessment, and a new set of external research projects will be funded to investigate the effects of climate change and environmental conditions on economically and ecologically important fish species.

Educating the Next Generation of Bay Stewards

Advancing student environmental literacy to ensure stewardship of the Chesapeake Bay now and in the future

- NCBO provided $5.2 million in funding through the NOAA Chesapeake Bay Watershed Education and Training Program (B-WET) to support 34 environmental education projects in the region. During FY 2021 and 2022, these projects delivered Meaningful Watershed Educational Experiences to 34,000 students and professional development training to 1,900 teachers. To enhance this work, NCBO created a five-part video series about community engagement and hosted related conversations to support the capacity of grantees to design and implement programs grounded in equity and inclusion.
- NCBO worked with partners to provide training and support for newly established state environmental literacy networks. These networks focus on increasing the number of local school districts that have strategic, equitable, and sustainable environmental literacy portfolios – a key priority for NCBO. They also prioritize and advance climate change education, workforce, STEM, and other Administration priorities.
- NCBO worked with partners around the Chesapeake Bay region to increase climate change education in the mid-Atlantic. This included a focus on climate change education in the B-WET program. NCBO also facilitated training opportunities through the NOAA Environmental Science Training Center, including a virtual event that brought together more than 150 education stakeholders to share best practices and emerging strategies on climate justice, youth leadership, and climate education resources. A smaller 3-day event with key partners also identified priority areas to advance climate change education, including workforce development and youth action, advocacy, and programming.
- In response to COVID-19 disruptions, NCBO worked with the Chesapeake Bay Trust to administer an emergency relief grant program to support continuing operations at environmental education organizations. NCBO also brought B-WET grantees and the larger environmental literacy community together to share strategies to support school districts throughout the pandemic.

Continuing Activities

NCBO will increase support for climate education, including funding climate-focused projects through NOAA B-WET and supporting professional learning and networking opportunities. This work will be fully integrated with NCBO's existing environmental literacy portfolio, which focuses on implementation of Meaningful Watershed Educational Experiences.

Students learn at a B-WET–supported educational experience; photo by NOAA Chesapeake Bay Office

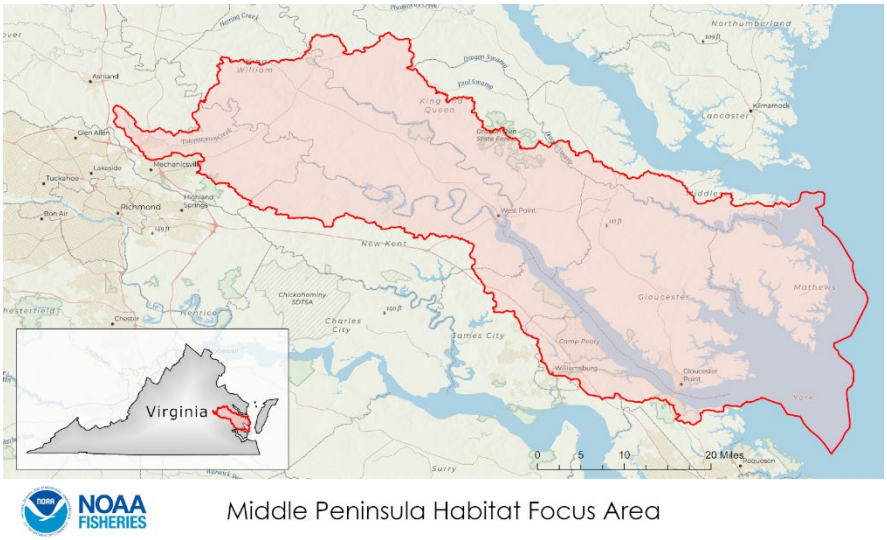
Engaging in Community-Based Partnerships

Targeting action in NOAA Habitat Focus Areas to channel resources into ecologically and economically important geographies

- In 2022, NOAA selected Virginia's Middle Peninsula as a NOAA Habitat Focus Area (HFA). This is the second HFA in the Chesapeake Bay watershed. Efforts will focus on restoring and conserving fish habitat and enhancing coastal community resilience to climate change in this highly vulnerable area. To ensure a firm local foundation for the goals of this HFA, NCBO partnered with the York River and Small Coastal Basins Roundtable, supporting the Roundtable's strategic planning, coalition building, and communications.
- Working with the Roundtable, NCBO is leading an initiative to draft a wetlands restoration and conservation plan for the area that stakeholders can use to identify priority sites and attract funding for nature-based projects that will protect and support local coastal communities.
- Also in the Middle Peninsula HFA, two coastal green infrastructure projects based on designs developed using NCBO funding are now in the implementation phase: HFA partner funds are supporting approximately $1 million for the Hog Island Living Shoreline project in Mobjack Bay and more than $4 million for U.S. Navy nearshore habitat restoration projects along the York River. NCBO's technical support and funding for a 150-acre oyster reef restoration project in the York River attracted an additional $400,000 investment in the project from the Virginia Coastal Zone Management Program.
- Efforts continued in the NCBO-led Choptank HFA. NCBO provided funding and staff support to Envision the Choptank to update that partnership's shared strategic plan. It includes collaborative actions for climate resilience that build on Envision the Choptank's unique partnerships. The group is exploring new ways of obtaining support to build climate resilience and local capacity, with an emphasis on reaching underserved communities that have been disproportionately affected by climate change.

Continuing Activities

NCBO will coordinate with other NOAA line offices to provide technical assistance for coastal habitat restoration, deliver NOAA science to support local decision-making, and foster inclusive community engagement and partnership development in the Middle Peninsula HFA. NCBO will support development of programs to engage communities in climate resilience and nearshore habitat restoration.



Map outlining NOAA's Middle Peninsula Habitat Focus Area; developed by NOAA Chesapeake Bay Office

Enhancing Climate Resilience

Developing strategies to help communities and ecosystems become more resilient in a changing climate

- NCBO coordinated the Chesapeake Bay Program's Climate Resiliency Workgroup, including monthly meetings connecting partners on climate monitoring and assessment and adaptation efforts. The group also implemented a project to synthesize existing resilience and social vulnerability metrics and identify partners' marsh restoration and research priorities. This will inform the selection of areas for collaborative large-scale tidal marsh restoration and resilience research projects.
- NCBO collaborated with the U.S. Fish and Wildlife Service and the Mattaponi Indian Tribe on the design phase of a living shorelines project. This project is intended to protect tribal lands from erosion and enhance fish habitat.
- NCBO helped to lead a Chesapeake Bay Program workshop on rising water temperatures. The workshop led to the identification of tidal fish and submerged underwater vegetation sensitivities to rising water temperatures. It also highlighted corresponding management implications and recommendations on research and management needs to better prepare for rising water temperatures.

Continuing Activities

NCBO will continue to support the Climate Resiliency Workgroup, bringing experts together to accelerate adaptation strategies that support fisheries, habitat, community resilience, shoreline protection, and tidal wetland restoration under changing climate conditions. NCBO will continue efforts to identify criteria for targeting tidal wetland restoration projects and will assist partners looking to support green infrastructure projects that enhance fish habitat and strengthen the economy. NCBO will continue to integrate climate change science in the assessment of risk for fish and their habitats.

Cars traveling through a flooded road; photo by Virginia Sea Grant/Aileen Devlin

Fostering Organizational Excellence

Incorporating people and perspectives from those traditionally underserved and underrepresented in efforts to protect and restore the Chesapeake Bay

- NCBO developed a report detailing best practices for engaging with indigenous peoples and local communities and for how to weave Traditional Ecological Knowledge with NOAA work. The report contains suggestions from staff across NOAA who work with tribes, indigenous communities, and Traditional Ecological Knowledge. NCBO began building relationships with the Pamunkey, Mattaponi, and Upper Mattaponi Indian Tribes in the Middle Peninsula HFA, including providing technical assistance for their coastal resilience needs. This is only the start of a longer-term vision for stronger NCBO tribal relations across the Chesapeake.
- NCBO again hosted several college- and graduate-level summer interns each year, including several through the Chesapeake-Student Recruitment, Early Advisement, and Mentoring (C-StREAM) Program. C-StREAM internships are designated for college students who identify as people of color and/or who are first-generation college students. Internships let students explore careers in Chesapeake Bay-related marine biology, oceanography, environmental education, and more – and these talented students augmented NCBO capabilities on time-relevant projects.

Continuing Activities

NCBO will continue to develop supportive relationships with tribal communities as well as Historically Black Colleges and Universities and Minority-Serving Institutions to enhance the equity and inclusion of NOAA's science, service, and stewardship work. NCBO will support programs and outreach about grant opportunities and will continue developing more equitable STEM workforce pathways through career development programming, including C-StREAM internships.

An NCBO intern sets up monitoring equipment; photo by Chesapeake Bay Program/Will Parson

Research, Monitoring, and Data Collection Activities for NOAA to Support the Chesapeake Bay Watershed Agreement

Research Considerations

Climate change is affecting fish, habitat, and communities in the Chesapeake Bay. Water temperatures are rising. In response, some fish species such as summer flounder are using Chesapeake Bay habitats less, while other southern species like red drum are likely more prevalent as they move northward. Changing seasonality and weather patterns, along with variable dissolved oxygen levels, may be influencing striped bass spawning success and blue crab survival. Seagrass and marsh habitats also face increasing stress from the effects of climate change. These serve as critical foraging and nursery habitat for blue crabs and multiple fish species like striped bass. In turn, the variability in fish abundance and habitat quality affects local communities and economies.

Habitat conservation using oysters and other nature-based structures could help mitigate the effects on these habitats, enhance fish habitat, and provide community resilience. However, there are still many questions about these climate impacts, the responses of living resources to restoration efforts, and how habitat conservation can serve as a management strategy. Therefore, NCBO is leading research to better understand these impacts to inform fishery management, habitat restoration, and community resilience management decisions. NCBO is leading efforts to quantify the effectiveness of marsh restoration, the ability of nearshore oyster reef structures to provide shoreline protection and fish habitat, and the economic value and other societal benefits oyster reefs and nearshore habitats provide.

Monitoring and Data Collection Considerations

NCBO is also developing new monitoring capabilities. Hypoxia buoys identify changes in primary water column habitat parameters (temperature, salinity, dissolved oxygen), and acoustic telemetry arrays track changes in the movement of fish species. NCBO is increasing its investment in acoustic telemetry and fish tagging to track how fish are moving in response to climate change, other environmental conditions, and habitat restoration.

In addition, NCBO and partners are also using existing technologies in new ways. Video has shown to be potentially useful, even in the Chesapeake's often-murky waters. NCBO is interested in using video to assess how fish use nearshore habitats, including at the Poplar Island restoration project. Video has also been used to study the health of restored oyster reefs, and NCBO is working with restoration partners and academic institutions to incorporate video into annual oyster monitoring.

Conclusion

During FY 2021-2022 NCBO, consistent with its mission as established by the NOAA Authorization Act, 15 U.S.C. § 1511d, has:

- Worked with partners on the world's largest oyster reef restoration project.
- Facilitated sustainable Bay fisheries by providing relevant, updated science.
- Tracked environmental data about the Chesapeake Bay.
- Implemented systems to track tagged fish and monitor dissolved oxygen.
- Supported Bay watershed education for thousands of students and related professional development for teachers.
- Fostered the development of networks of environmental educators.
- Coordinated internal and external partners' efforts in the Choptank Complex and Middle Peninsula Habitat Focus Areas.
- Increased climate resiliency planning efforts in the watershed.
- Made progress toward organizational excellence and a more diverse future workforce.

Moving forward, NCBO will continue to focus on improving the understanding, management, and stewardship of the Chesapeake Bay. This will include work toward achieving the 2014 Chesapeake Bay Watershed Agreement goals relating to sustainable fisheries, vital habitats, environmental literacy, and climate resiliency as well as supporting monitoring efforts to track progress toward these goals.

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March 2023

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Front cover: The Mattaponi River snakes through wetlands, forests, farms, and residences; photo by Chesapeake Bay Program/Will Parson