The Comprehensive Conservation & Management Plan for Maryland's Coastal Bays (2025–2035)

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Dear Partners,

For nearly 30 years, the Maryland Coastal Bays Program (MCBP) has championed the preservation and enhancement of one of our nation's most treasured estuaries. Guided by our Comprehensive Conservation & Management Plan (CCMP), we have worked collaboratively to set ambitious goals, measure progress, and implement effective conservation strategies. This commitment has united agencies, organizations, and dedicated volunteers in a shared mission to protect the Coastal Bays for future generations.

Over the past 28 years, in collaboration with our dedicated partners and volunteers, we have amassed a comprehensive database on water quality, the health of wetlands and forests, and the status of wildlife and fisheries. This invaluable long-term data not only uncovers critical trends and patterns but also highlights current priorities. It enables us to anticipate emerging challenges, ensuring we can address pressing issues both now and in the coming ten years.

Our collective efforts have yielded encouraging results. Fish populations remain mostly stable, water quality in many of our Bays is improving, and clam populations have made a remarkable recovery. However, significant challenges persist. Submerged aquatic vegetation (SAV) has yet to return to our northern Bays, vast stretches of tidal marsh are disappearing due to sea level rise and other factors, and iconic coastal bird species struggle to nest successfully, hindered by the ongoing loss of habitat. Climate change is no longer a distant concern—it is here, reshaping our environment today. Rising water temperatures, intensifying storms, and accelerating sea level rise are challenges that demand urgent attention, with their impacts set to grow even more pronounced in the next decade.

This document outlines our strategy to confront the defining environmental challenges of the next decade while highlighting the roles of lead agencies and organizations. Certain actions will be best addressed by external partners, while the Maryland Coastal Bays Program will spearhead others. Regardless of the lead, these management efforts are a testament to the power of collaboration—a shared commitment between partners working in unison to safeguard the Coastal Bays.

Since 1996, this collaborative approach has driven remarkable achievements—made possible by the unwavering dedication of our partners, volunteers, and supporters, as well as the vision of our past Directors, Board members, and staff. Their tireless efforts have sustained the Coastal Bays, ensuring its vitality for current and future generations. With that same spirit of commitment, we embark on the next 10 years, focusing on the actions necessary to preserve and enhance this beloved local treasure and nationally recognized estuary.

Sincerely,

Kevin Smith
Executive Director
Maryland Coastal Bays Program

Steve Taylor
Chairman of the Board
Maryland Coastal Bays Foundation

A Letter From the Governor

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The Maryland Coastal Bays Program wishes to offer thanks and appreciation to all the partner agencies and organizations that have provided content and review of the CCMP. We look forward to the continued partnership for the next ten years.

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INTRODUCTION

This Place We Call Home

The stories of the Coastal Bays echo throughout history, emanating like ripples from a stone dropped in water. A tale is told in each beat of a saltmarsh sparrow's wings, every ribbon of eelgrass waving beneath the water's surface, and within the shifting shape of shorelines. Stories of the people who once roamed these marshes, forests, and waters hum beneath our feet. Although their footprints have long since been swallowed by a squelch of detritus or swept clean by the incoming tide, their stories offer a deeper understanding of this place we call home.

Around 80,000 years ago, *Homo sapiens* took a brave step outside our African homeland in a spirit of exploration our species embodies to this day. This spark can be observed in the fishermen roaming Chincoteague Bay in their skiffs during flounder season, or in the birdwatcher bushwhacking on Assateague Island in search of a northern saw-whet owl. Humans migrated onto the Eastern Shore more than 10,000 years ago, drawn by an abundance of fish, fur, and fowl. These first people used the Coastal Bays as seasonal hunting and fishing grounds. The Pocomoke and Assateague peoples made it their home, and continue to live here today.

The introduction of maize farming in the Late Woodland period around 900 C.E. enabled permanent settlements to take root. Villages sprouted along with the corn the Native Americans grew, cozy huts with reed-woven roofs nestled on the banks of tributaries. Native people crafted dugout canoes from cypress trees found deep in knobby-kneed forested swamps. They combed shallow bay waters for shellfish in what one can imagine was the first rendition of the "Assateague Shuffle" as they located hard clams beneath their feet. The land provided nuts from oak, hickory, and pine forests, and the marsh supplied edible tubers known as "tuckahoe." Whittled spears and intricately constructed nets and fishing weirs were used to catch shad, striped bass, and white perch.

Native Americans fishing by canoe. Illustration by John White, courtesy of the British Museum, CC BY-NC-SA 4.0.

Maize/corn has dominated Coastal Bays agriculture since the earliest

Around this time only a few thousand indigenous people lived on the Eastern Shore, with about 300 permanent residents in the Coastal Bays, although many more migrated through the region with the seasons.

In 1524, the leather soles of colonists marched across the landscape like words on a page, writing the beginning of a new chapter for the Coastal Bays. Giovanni de Verrazzano and his crew are recognized as the first Europeans to explore this nook of the Shore, and a trickle of hunters, fisherman, and trappers soon followed. The area remained sparsely populated by settlers for the next hundred years, yet by the mid-1600s pressure began to mount on the native people who had spent thousands of years accepting the bounty that this productive area offered. Despite this deep relationship to the land, European settlers uprooted indigenous people to a reservation on the banks of the Pocomoke River in 1686. Challenging living conditions on site drove most of them to move north into Delaware after only a few years, integrating with other tribes, many of which ultimately followed various migration routes out of the region.

Beach tourism drives the local economy today. Ocean City, MD pier via Wikimedia Commons, CC BY-SA 3.0.

For years the narratives of these original storytellers of the Coastal Bays remained stacked like a pile of books on a side table, spines faded from age and waiting to be read. In recent years those books have been reopened, setting the stories free to be met with appreciation, acknowledgment, and reverence for the rich indigenous history that knits the foundation for humans in the Coastal Bays.

During the colonial period the abundance of the area was harnessed in new ways. Change came slowly at first as the Coastal Bays watershed became fluent in farming, logging, fishing, and tourism. Rich soils were fielded and farmed to produce crops of tobacco, corn, and wheat. Trees became timber, providing valuable harvests of cypress, oak, poplar, and gum. Railroads zippered across the Eastern Shore in the 1800s, bringing population growth to remote areas with the newfound ease of transportation. As the 19th century gave way to the 20th, Ocean City metamorphosed from a rustic fishing village to a popular resort destination. Each summer, visitors flocked to the growing city like royal terns returning to nest, drawn by the weathered wooden boardwalk perfect for strolling and the cool summer breezes sweeping off the Atlantic.

While humans have played their part in shaping this region, mother nature is not to be forgotten. A hurricane ripped up the coast in the August of 1933, cleaving Fenwick Island in two as an inlet broke through in a rush of floodwater. This act of nature set Assateague Island on its own unique course. While the Coastal Bays were connected to the ocean periodically in the past with inlets opening and closing during storm and tide events, the 1933 breach was stabilized with a concrete seawall to ensure it remained open, creating the Ocean City Inlet that we know today. With the establishment of a marina and an open door to the ocean, pound fishing gave way to thriving offshore ocean fisheries.

Change is the only constant in the Coastal Bays. When the engineering triumph of the Chesapeake Bay Bridge was completed in 1952, a summer weekend at the beach became feasible for many families. Tourism flourished and the population of the Coastal Bays watershed boomed. In a nod to the unspoken draw of raw and wild places, Assateague State and National Parks were designated in the mid-1960s. This conservation effort preserved a landscape where visitors can hear the whispers from the past more clearly without the noise of boardwalk arcades or weekend traffic.

Today the Coastal Bays exhibit a library of voices, from the buzz of recreational boat motors in August, to the throaty squawk of a great egret settling onto a pitch pine branch, to an energized crowd shouting the chorus at a musical festival on the beach. The stories from the past to the present weave around one another, intertwining to become a unique and dazzling body of literature. One need not open a book to discover this enchanting story; perhaps the best place to read the novel of this place we call home is in the quiet solitude of a sunset upon a golden marsh.

The Ocean City Inlet was created by the 1933 storm. Photo by Jane Hawkey, IAN Image Library.

EPA Acknowledgment

The Federal Water Quality Act of 1987 amended and extended the Clean Water Act Section 320, and formally established the National Estuary Program (NEP) to promote long term planning and management of nationally significant estuaries threatened by pollution, development, or overuse.

The NEP is an Environmental Protection Agency (EPA) non-regulatory place-based program, created to protect and restore the water quality and ecological integrity of estuaries of national significance. Twenty-eight estuaries found along the Atlantic, Gulf, and Pacific coasts and in Puerto Rico are included in this collection. These NEPs were selected after national solicitations seeking nominations to the program and are in a variety of institutional settings, including state and local agencies, universities and individual nonprofits. In overseeing and managing the national program, EPA provides annual funding, national guidance and technical assistance to the local NEPs.

The Maryland Coastal Bays Program (MCBP) was inducted into the National Estuary Program (NEP) in 1996 and became the 28th NEP in the U.S. Since that time, partners and stakeholders have been engaged and have worked to fulfill the mission of the MCBP. This could not have been achieved without the support of the EPA and guidance of the National Estuary Program.

Maryland Coastal Bays Program: Who We Are

Maryland's Coastal Bays are a treasured natural resource, offering a wide range of ecological, recreational, and economic benefits to the community. The health and long-term sustainability of the Coastal Bays is, however, threatened by a variety of human activities in the Bay system and adjacent watershed. As a National Estuary Program, Maryland Coastal Bays Program (MCBP) is a non-profit partnership among the towns of Ocean City and Berlin, the National Park Service (NPS), Worcester County, the U.S. Environmental Protection Agency, and the Maryland Departments of Natural Resources, Agriculture, and Planning.

The MCBP program goal is to protect and enhance the watershed, which includes Ocean City, Ocean Pines and Berlin, and Assateague Island National Seashore. Located east of Route 113, the 175-square mile watershed is home to the treasured resources of the St. Martin River, Newport Bay, Assawoman Bay, Isle of Wight Bay, Sinepuxent Bay and Chincoteague Bay. The watershed includes more than 189,000 acres of land, 71,000 acres of water, 248 miles of shoreline, and nearly 35,000 acres of wetlands. Guided by the Management Conference and its collective membership, MCBP staff engages the local community and beyond, to implement creative solutions for resource protection and conservation in the Coastal Bays.

The Maryland Coastal Bays Foundation is the incorporated part of MCBP. The Foundation is a private, non-profit entity organized and existing under the laws of the State of Maryland. The Foundation provides exclusively for charitable, educational, scientific, and conservation purposes, including assisting MCBP in the development and implementation of the Comprehensive Conservation & Management Plan (CCMP). The goal for the Foundation is for the protection and conservation of the waters and surrounding watershed of Maryland's Coastal Bays to enhance their ecological values and sustainable use for both present and future generations. To conduct this goal, the Foundation:

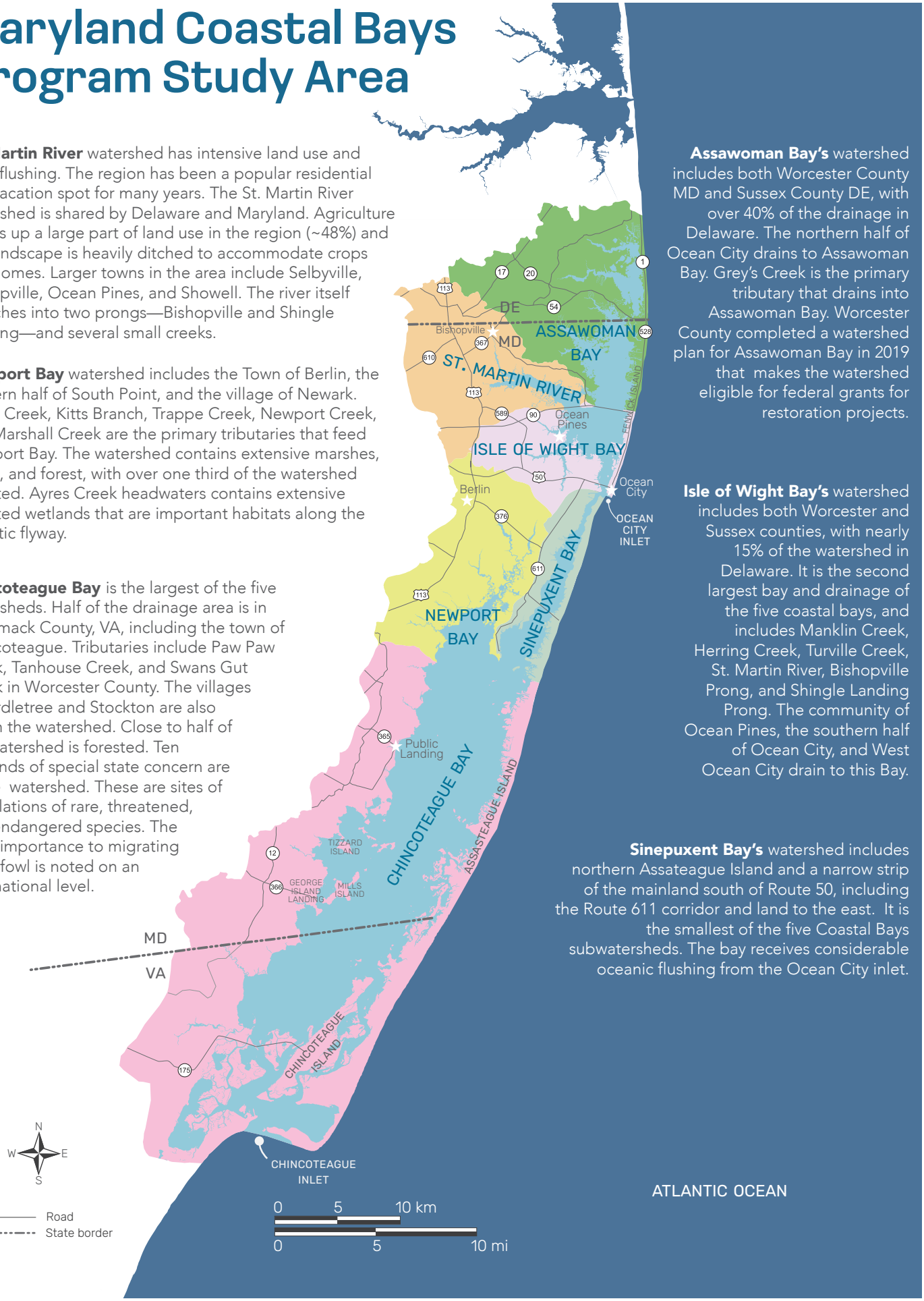
- Engages federal, state, and local partners as well as the public in defining the health concerns and conservation needs of the Coastal Bays and their watersheds.
- Implements management strategies defined in the CCMP following the Federal Clean Water Act as the Maryland Coastal Bays National Estuary Program.
- Develops and uses factual scientific information to improve the health and sustainable use of the Coastal Bays and their watersheds.
- Promotes responsible stewardship and actions to improve the Coastal Bays and their watersheds through public outreach and education; and
- Conducts fundraising activities to secure public and private grants and donations to support environmental improvements beyond those provided by existing funding sources.

Maryland Coastal Bays Program Study Area

St. Martin River watershed has intensive land use and poor flushing. The region has been a popular residential and vacation spot for many years. The St. Martin River watershed is shared by Delaware and Maryland. Agriculture makes up a large part of land use in the region (~48%) and the landscape is heavily ditched to accommodate crops and homes. Larger towns in the area include Selbyville, Bishopville, Ocean Pines, and Showell. The river itself branches into two prongs—Bishopville and Shingle Landing—and several small creeks.

Newport Bay watershed includes the Town of Berlin, the western half of South Point, and the village of Newark. Ayres Creek, Kitts Branch, Trappe Creek, Newport Creek, and Marshall Creek are the primary tributaries that feed Newport Bay. The watershed contains extensive marshes, farms, and forest, with over one third of the watershed forested. Ayres Creek headwaters contains extensive forested wetlands that are important habitats along the Atlantic flyway.

Chincoteague Bay is the largest of the five watersheds. Half of the drainage area is in Accomack County, VA, including the town of Chincoteague. Tributaries include Paw Paw Creek, Tanhouse Creek, and Swans Gut Creek in Worcester County. The villages of Girdletree and Stockton are also within the watershed. Close to half of the watershed is forested. Ten wetlands of special state concern are in the watershed. These are sites of populations of rare, threatened, and endangered species. The bay's importance to migrating waterfowl is noted on an international level.



Assawoman Bay's watershed includes both Worcester County MD and Sussex County DE, with over 40% of the drainage in Delaware. The northern half of Ocean City drains to Assawoman Bay. Grey's Creek is the primary tributary that drains into Assawoman Bay. Worcester County completed a watershed plan for Assawoman Bay in 2019 that makes the watershed eligible for federal grants for restoration projects.

Isle of Wight Bay's watershed includes both Worcester and Sussex counties, with nearly 15% of the watershed in Delaware. It is the second largest bay and drainage of the five coastal bays, and includes Manklin Creek, Herring Creek, Turville Creek, St. Martin River, Bishopville Prong, and Shingle Landing Prong. The community of Ocean Pines, the southern half of Ocean City, and West Ocean City drain to this Bay.

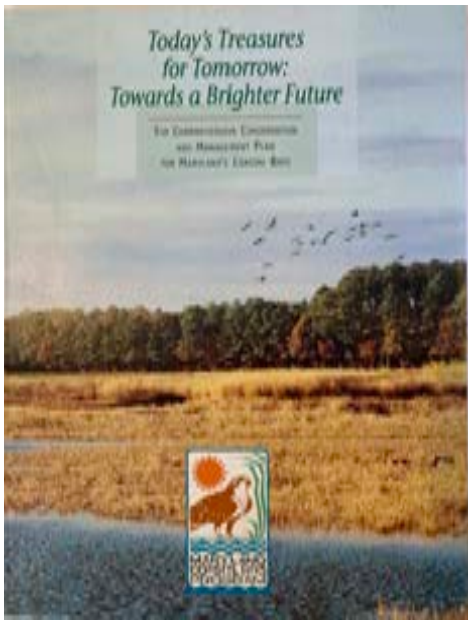
Sinepuxent Bay's watershed includes northern Assateague Island and a narrow strip of the mainland south of Route 50, including the Route 611 corridor and land to the east. It is the smallest of the five Coastal Bays subwatersheds. The bay receives considerable oceanic flushing from the Ocean City inlet.

What is a Comprehensive Conservation & Management Plan?

Each estuary program works within its community to develop a Comprehensive Conservation & Management Plan (CCMP) designed to protect water quality, habitat, and living resources within its watershed. The CCMP is uniquely tailored to the local environmental conditions and is based on input by local, city, state, federal, private, and non-profit stakeholders, thereby supporting local priorities.

The CCMP provides a long-term framework for action. Actions within the CCMP that inform the annual MCBP workplan specify partners responsible for successful implementation. The Plan also names periods for completion, range of potential costs, milestones for completion and performance measures to provide intended results. In addition, the CCMP includes critical components for monitoring along with strategies for Finance, Habitat Protection/Restoration, and Communication/Outreach.

EPA describes the CCMP as a critical part of the NEP model of adaptive management, suggesting a continual process of integrating new data and results. As such, there are provisions within the EPA guidance for both updating (minor changes) and revising (major changes) to the CCMP.



Revising the CCMP

The 2025 CCMP is the third in a series of original and revised CCMP's designed to guide the MCBP since its nomination to the NEP in 1995. The first CCMP process began in 1996 with a widely expanded membership of the original Management Conference to include not only the Policy Committee, but also a Management Committee (later to become the Implementation Committee), Interested Parties and Citizens Advisory Committees (CAC), Scientific and Technical Advisory Committee (STAC), and MCBP staff. Their hard work culminated in a draft plan in June 1999 and was published in 2000.

The 2000 CCMP was revised in 2015, after a three-year process of engaging stakeholders to define the most significant issues related to water quality and environmental health of the watershed. This plan was also a compilation of management recommendations from local, state, and federal partners and the public, approved by EPA and including four plans, 15 goals, 33 challenges, and 222 actions to guide watershed management efforts for the following ten years.

As a "living document" it is EPA's expectation that the CCMP be re-examined and revised on a regular basis. Several criteria to decide the necessity for revision to the 2015 Plan include the significance of new CCMP goals, latest information obtained through study and monitoring, and a 10-year time span since the earlier CCMP. EPA has issued FY 2021 – FY 2024 CLEAN WATER ACT §320 NATIONAL ESTUARY PROGRAM FUNDING GUIDANCE Appendix 5 - NEP Comprehensive Conservation & Management Plan Revision and Update Guidelines for revisions to an existing CCMP for all NEP organizations. The MCBP has paid close attention to that guidance in the revision of the 2015 plan.

Priorities and goals that have changed significantly during the 10-year period 2015–2025 embrace climate action and resiliency planning throughout the watershed. Integration of Diversity, Equity, Inclusion, Justice, and Accommodations (DEIJA) into MCBP organizational and programmatic policies and actions is also a recent addition to the comprehensive suite of program opportunities. MCBP has also developed a robust environmental literacy element to the program efforts through education at all levels, communication, outreach, and engagement for all watershed residents and visitors.

In 2020, MCBP completed a midpoint assessment of the 2015 CCMP that was approved by the EPA. The goal of the midpoint assessment was to characterize progress made toward completing CCMP actions, and consider if incomplete activities should be changed, more resources added, continued as is, or discontinued. The full results of the report provided a solid foundation for the CCMP revision process. The assessment process also provided a renewed interest and understanding among the partners of their respective and collective commitments and responsibilities under the CCMP.

During the 10-year period of the 2015 CCMP, there were two Program Evaluations conducted by EPA of the MCBP. The primary purpose of the evaluations, jointly conducted by EPA Region 3 and Headquarters NEP staff, was to decide if the 28 member NEP programs are making continuous progress implementing their CCMP's. In 2019 and 2024, EPA determined that MCBP had made significant progress in implementing the CCMP. Each evaluation summarized program strengths and indicated where programs could improve and grow. MCBP was identified as an early leader in completing the EPA sponsored Climate Change Vulnerability Assessment and later, the Climate Change Action Plan. It was also through the Program Evaluation that Coastal Resiliency was identified as an area to increase capacity during the 2025–2035 period. The evaluation process also recommended building effective strategies for DEIJA and community engagement.

EPA offered additional funding opportunities through the Bipartisan Infrastructure Law (BIL) Funding for National Estuary Programs. MCBP submitted separate workplans for projects that supported resilient infrastructure for future climate and clean water concerns, especially in communities that had been traditionally underserved. This five-year window of funding has provided MCBP with a host of important projects to design, complete, and in some cases launch new program partnerships that will carry over into the 2025 CCMP and beyond.

The program science strategies guided through the STAC, have produced two comprehensive State of the Bay Reports in 2016 and 2022. In addition, annual Report Cards on the health of the Bays are developed using environmental indicators developed through a body of strong science in monitoring, data collection and synthesis. In partnership with University of Maryland Center for Environmental Science and the Maryland Department of Natural Resources, MCBP has made the results of these key assessments an important part of the revision in the 2025 CCMP.

The revision to the 2015 CCMP began in June 2022 during a meeting with EPA Headquarters and Region 3 representatives to lay out a path forward and timeline for the CCMP project. After discussion of the EPA checklist for CCMP revision and identified priorities, it was determined that the project should proceed with frequent participation and updates for EPA and all Management Conference members.

MCBP conducted a review of other recently completed CCMP documents to evaluate structure, design, content, and conformance with EPA criteria. The CCMP's reviewed included Delaware Center for the Inland Bays, Barnegat Bay Partnership, Partnership for the Delaware Estuary, Peconic Bay Estuary, and Coastal and Heartland NEP. The MCBP reached out to NEP representatives of several of the organizations as well; to document the experience they had in the development of these plans. This step was critical in setting a course for the MCBP revision process.

Next steps included a series of brainstorming sessions with MCBP leadership and staff in the fall of 2022 to consider a revised set of primary Themes for the MCBP CCMP and how to identify those with new priorities, while maintaining the identity of current program effort.

With a range of options presented from other CCMP recently completed, along with new ideas shared by the group, the 4 Themes for the revised CCMP were drafted as Provide

Healthy Waters; Protect Fish, Wildlife and their Habitat; Create Resilient Communities and Ecosystems; and Develop Public Engagement and Partnerships. Staff were encouraged to consider Goals that fit the Theme for their respective areas of expertise and draft Goals were identified.

Further conversations with EPA were held to benchmark initial progress, and to ensure the path for development of document structure, outline of narrative content, creation of revised Themes, Goals, and Actions, and partner input and engagement were all sound approaches.

In early 2023, document version 1.0 was created using the following steps: 1) Solicit broad ideas for revised Themes and Goals and draft those in place; 2) Crosswalk previous Actions (completed, in-progress and not initiated) with revised Themes and Goals to begin adding those Actions to the draft outline; 3) Engage STAC and IC in progress to date; 4) Identify new or heightened areas of focus and determine how to integrate those into a prioritization for inclusion into CCMP (Climate Issues, Environmental Education, Habitat Restoration); 5) Develop new Actions around any updated focus areas and revise skeleton draft; and 6) Identify areas to be discontinued or lessened in the number of Goals and Actions.

Simultaneously, work began with a cooperative agreement with the University of Maryland Center for Environmental Science (UMCES) Integration and Application Network (IAN) for the design, layout, and communication of the information produced in the revised CCMP.

During the summer and fall of 2023, Themes, Goals, and Actions content V. 1.0 was sent out to MCBP partners for agency review as well as the Scientific and Technical Advisory Committee (STAC) and the Implementation Committee (IC). The reinvigorated Citizen Advisory Committee (CAC) was also introduced to the revision process and began their evaluation of the initial changes.

A follow-up meeting with EPA in September of 2023, indicated support for the direction the revision was heading, with positive comments on the process, and especially the effort related to the involvement of stakeholders and the public. EPA also evaluated the Themes as drafted and said that they reflected well on the components of the EPA Program Evaluation.

At this meeting, MCBP noted that the revised CCMP would be significantly informed by the Climate Change Vulnerability Assessment and Climate Change Action Plan. This would include addressing the effects of recurring extreme weather events on the estuary through the identification and assessment of vulnerabilities in the watershed.

From fall and winter of 2023, online and in-person meetings were held and the program received over 300 comments from 15 agency partners, MCBP staff, Board, and Committees. These comments formed the basis for V. 2.0. As a result, 23 new Actions were added, 52 Actions discontinued or combined, and 126 Actions carried over in the revision. Work

MCBP Public Input Meeting flyer.

progressed to add the required elements to the draft Actions and in June 2024, the full draft of V. 2.0 was sent for review to the full compliment of partners and agencies for review.

Concurrently, MCBP conducted outreach to the public, key stakeholders, and public officials soliciting input for the revised CCMP. This included an online questionnaire, a series of public input sessions in locations across the watershed, and briefings with County and municipal policymakers. Comments from agency partners and input from these outreach activities were reviewed and incorporated into the draft of the Themes, Goals and Actions in the CCMP. This draft, along with the narrative sections of the revised Plan authored by MCBP staff and consultants, were compiled and submitted to EPA, partners, the public, and Management Conference committees for a final round of review and comment. This last review period culminated in the complete published CCMP document that will guide MCBP and partner efforts for the 2025–2035 period.

Updates from the 2015 CCMP to the 2025 CCMP

In revising the 2015 CCMP, the MCBP was intentional in the decision to be forward leaning in the program priorities while building on the successful implementation of the current CCMP. Many of EPA's identified important areas for concentrating future program resources such as climate change, building innovative resiliency in community projects and policies, and Diversity, Equity, Inclusion, Justice, and Accommodation (DEIJA) programs are already being implemented through the current workplans.

In 2023, EPA approved MCBP's proposed workplan and budget for the first two years (2022/23) of Bipartisan Infrastructure Law (BIL) funding allocated to NEPs. Those workplans and work to be continued with BIL funding include a balance of restoration and stormwater management projects, ongoing and new Outreach and Education programs, capacity-building activities, and special projects, many of which focus on the BIL priorities of climate change resilience and environmental justice.

The 2025 CCMP provides an opportunity to add strength to the identity of those priorities, and to ensure that their implementation continues during these next ten years. As well, MCBP recognizes the need for additional grant resources for ecological enhancements for bird habitat, improving marsh health, water quality improvements, and shoreline restoration requiring a partnership approach with multi-level investments for success.

The four Plans in the 2015 CCMP: Water Quality, Fish and Wildlife, Recreation and Navigation, and Community and Economic Development, have shifted to a more action-oriented emphasis to better represent the current and future 10-year priorities. Water Quality is of course steadfast in importance, and the 2025 Theme of Provide Healthy Waters is a statement of need for overall ecosystem health. Fish and Wildlife is now represented in a Theme for Protect Fish, Wildlife, and Their Habitat. It is important to recognize that a healthy habitat is vital for living resources in the Coastal Bays.

Two Plans prominent in the 2015 CCMP, Recreation and Navigation, and Community and Economic Development are not lost in the revision. Their implementation is now being brought into the broader Themes of Create Resilient Communities and Ecosystems and Develop Public Engagement and Partnerships. Resilient community actions such as beneficial use of dredged materials, are planned for the next ten years in the CCMP that will improve navigation and recreation opportunities in the bays, continue building for future climate challenges, and confirm that economic vitality is connected to a healthy ecosystem.

Developing Public Engagement and Partnerships as a Theme creates synergy for all the Goals and Actions in the 2025 CCMP. It will take a new level of education and outreach from school and classroom learning to citizen action to continue to meet the challenges for the bays in the next 10 years. Partnerships among federal, state, and local agencies working together perhaps in ways not done in the past, will be necessary to fund, build and monitor natural infrastructure well beyond the period of the revised Plan.

The 2025 CCMP also streamlines the approach to implementation in a way that improves the 2015 Plan. Themes, Goals, and Actions now directly feed into the Annual Workplan so that each year, along with the added Strategies for Monitoring, Finance, Habitat and Communication, the Annual Workplan stays current and on-target for strong impacts toward the conservation and restoration of the Bays.

2015 CCMP	2025 CCMP
4 Action Plans	**4 Themes**
Water Quality	Provide Healthy Waters
Fish and Wildlife	Protect Fish, Wildlife and their Habitat
Recreation and Navigation	Create Resilient Communities and Ecosystems
Community and Economic Development	Develop Public Engagement and Partnerships

CCMP 2015–2025: Ten Years of Action

Implementation of the CCMP Actions during the past decade has been very successful. Based on an interim assessment conducted several years ago, more than 50% (114) of the 222 Actions had been completed or were achieving their main activities and operating on an ongoing basis. Only about 10% (21) of the 222 Actions had yet to be initiated, and only 5 Actions were slated to be removed due to their lack of current relevance, utility, or feasibility.

Resources for CCMP Action implementation have been primarily provided through annual grants to MCBP from EPA administered Clean Water Act funding; federal, state and local partner budgets; and project-specific grants from public and private sources.

Beginning in 2022, significant supplemental funding has been provided to MCBP through the federal Bipartisan Infrastructure Law (BIL). These resources have enabled the Program to support new and expanded MCBP and partner-led projects and build Program capacity, with priority focus on climate resilience and reaching disadvantaged and underserved populations in the watershed.

Below is a summary of some of the significant activities undertaken and accomplishments during this period.

Water Quality

- Coastal Bays health, as measured in the annual Report Card, is defined as the progress of four water quality indicators (nitrogen, phosphorus, chlorophyll a, and dissolved oxygen) and two biotic indicators (seagrass and hard clams) toward scientifically derived ecological thresholds or goals. Since 2015, the overall grade for the health of the Bays has held steady between a C+ and a B-, with the C+ earned in 2017 and 2022.
- In August of 2014, EPA approved the new TMDL for nitrogen and phosphorus for the Worcester County, MD portion of the Coastal Bays watershed. The sources of impairment in the watershed include some limited point sources (municipal wastewater treatment plants, spray irrigation facilities, concentrated animal feeding operations). These discharges have been dramatically reduced. No new direct discharges are allowed according to Worcester County statute.
- Nonpoint sources are the primary concern, including runoff from urban and agricultural land; on-site wastewater disposal (septic) systems; atmospheric deposition; and shoreline, ditch and stream channel erosion. Efforts to monitor and address these sources have included:
  - Ongoing annual water quality monitoring activities are conducted by MCBP staff and volunteers, Maryland DNR, and Assateague Island National Seashore. The resulting data is synthesized into the annual Report Cards and the State of the Bays reports.
  - Monitoring of harmful algal blooms (HABs), including Brown Tide, on an ongoing basis by DNR with assistance from MCBP, local partners and, beginning in 2024, trained volunteers.
  - Installation of two new continuous water quality monitoring stations in tidal waters to replace non-functioning stations.
  - Completion of a draft Maryland Coastal Bays Watershed Plan in 2017 establishing strategies for reducing pollutant loads from nonpoint sources. Only the Assawoman Bay portion of the Plan has been approved by EPA to date, and efforts to secure approval for the remaining watersheds will be a priority focus in the new CCMP term.
  - Completion of two assessment studies to identify and prioritize site-specific conservation and restoration project opportunities to reduce nonpoint nutrient inputs from urban, agricultural, and coastal-based sources.
  - Installation of enhanced stormwater management facilities in Berlin, Ocean Pines, and Ocean City to improve water quality and reduce flooding to downstream communities.
  - Significant progress by Worcester County in increasing sewer connections and installing septic system upgrades in rural areas.
  - Reduction and enhanced treatment of runoff from agricultural lands from implementation of nutrient management plans, including installation of best management practices (BMPs) such as buffers and cover crops.
  - MCBP has completed one, and will soon complete a second non-tidal wetland restoration on non-productive agricultural properties designed to capture and treat nutrient-laden runoff (see full story on page 12).

Fish and Wildlife

- Monitoring and habitat conservation/restoration for imperiled bird populations, with special focus on colonial waterbird species reliant on bay islands for nesting habitat (see full story on page 12).
- Identification, prioritization, and restoration of degraded saltwater marsh habitat in partnership with U.S. Fish and Wildlife Service, DNR, Audubon, Lower Shore Land Trust, and others to address shoreline erosion and interior ponding.
- Monitoring, maintaining, and enhancing terrestrial and shoreline habitat in restoration sites managed by MCBP.
- Ongoing monitoring of finfish and shellfish species for population assessment and commercial and recreational fisheries management.
- Monitoring and promotion of responsible local aquaculture industry.
- Annual surveys of horseshoe crab and diamondback terrapin populations using volunteer community scientists.
- Ongoing management of an Oyster Gardening initiative engaging volunteers to grow more than 43,000 oysters in cages off their personal docks, which are then deployed on an underwater reef in the St. Martin River.

Recreation and Navigation

- Ongoing dredging of navigational channels and offshore ocean bottom for beach replenishment in Ocean City and shoreline stabilization on Assateague Island.
- Development of sediment management plan to encourage and facilitate new focus on "dredging for restoration" and to better balance timing and location of dredging activity with need for material on island, marsh, and shoreline restoration projects.
- Facilitating and supporting enhanced access to watershed features and restoration sites for recreational and educational activities, including water access and trail development.
- Promoting and organizing litter prevention and cleanup initiatives, including source reduction/cigarette butt upcycling in Ocean City and marine debris collection events (see full story on page 13).

Community and Economic Development

- Published Economic Value of the Maryland Coastal Bays Watershed study to demonstrate that the watershed provides real and significant economic benefits to the regional economy and is worthy of investment to keep these natural resources healthy and productive.
- Supported and implemented land conservation programs resulting in the protection of hundreds of acres in the watershed.
- Ongoing outreach and communications with stakeholders from all sectors of the community, including residents, visitors, businesses and policymakers to inform them about environmental achievements, opportunities, and challenges in the watershed.
- Increasingly robust and diverse education programming reaching schools and the community to increase environmental literacy with particular focus on Coastal Bays ecology (see full story on page 13).
- Engaged community in a broad range of citizen science opportunities, including wildlife surveys and restoration site maintenance/enhancement activities to promote community understanding and stewardship.
- Conducted Climate Change Vulnerability Assessment to identify risks to effective CCMP implementation caused by climate change stressors and produced Climate Change Action Plan detailing specific adaptation actions to pursue through revised CCMP period.
- Planned and designed five major climate resilience restoration projects: one completed (Assateague State Park Shoreline), three awaiting construction permits (Tizzard Island, Reedy Island, Jenkins Point), and one shelved due to property owner concerns (Big Millpond).
- Developed and initiated implementation of an Equity Strategy presenting the strategies, projects, and activities through which MCBP and partners would seek to identify and respond to the needs and interests of disadvantaged and underserved populations in the watershed.
- Developed a Diversity, Equity, and Inclusion Strategic Improvement Plan to guide MCBP's efforts to better incorporate those principles into our organizational and programmatic endeavors.

Water Quality: Reducing Nutrient Runoff by Transforming Wet Cornfields into Wetland Habitat

Nutrient-laden runoff from agricultural fields is a major source of water quality impairment in the Coastal Bays. At the same time, poor drainage conditions exacerbated by increasing storm events and sea level rise is rendering significant areas of farm fields unproductive due to wet soils and saltwater intrusion.

A win-win-win solution to this confluence of events is the use of government cost-share payments to property owners to support the creation or restoration of wetlands on unprofitable sections of agricultural properties, providing for the storage and filtration of runoff, and creating habitat for wildlife dispossessed by farm fields and development sprawl.

In 2020, MCBP reached out to a property owner in the Church Branch watershed which drains into Isle of Wight Bay to explore possible nutrient reduction opportunities on his farm. Two years later, the farmer invited staff to visit his property to see what could be done to resolve drainage issues on perpetually wet sections of his land. This led to the design of a series of connected nontidal wetlands which was installed in 2024 with a combination of federal cost-share and Bipartisan Infrastructure Law funding. The results: improved drainage, reduced nutrient runoff, and an oasis for wildlife.

The hope is that this project will be a model for other farmers interested in pursuing a similar triple-win solution on their properties; a hope already bearing fruit with a commitment by a neighboring property to replicate the project later in 2025!

Aerial view of completed wetland. Photo by Roman Jesien.

Fish and Wildlife: Build an Island…Terns Will Come

Between 1990 and 2020 the number of state-Endangered Common Tern pairs nesting in the Coastal Bays fell from over 1,000 to approximately 35. This precipitous decline is the direct result of the coincident loss of suitable sand island habitat due to erosion and sea level rise, primarily associated with climate change. After efforts to restore bay islands with dredge material from 2014 to 2016 were literally washed away by 2017, MCBP in partnership with Maryland Department of Natural Resources and Audubon elected to pursue a dramatic alternative strategy: build and deploy an artificial floating island to attract and protect these nesting Terns.

And the results have been astoundingly successful! In the first year it was deployed in 2021, the platform hosted 23 nests from which 22 chicks were safely fledged. Buoyed by this initial success, a larger platform was deployed the following year, yielding 155 nests in 2022, 322 nests in 2023, and 304 nests to in 2024, hosting the largest breeding colony of Common Terns in the State. Despite this bountiful record, the artificial island is recognized as a short-term, stopgap measure. The only viable long-term solution is the creation or restoration of "natural" island habitat designed for sustainability in the face of storm-induced erosion and sea level rise.

Expanded floating tern raft as deployed in 2024.
Photo by Kim Abplanalp.

Recreation and Navigation: Preventing and Removing Litter and Marine Debris: Whether from Land or Sea

During the early years of the CCMP term, MCBP partnered with Ocean City and Ocean City Surf Club on beach and neighborhood litter collection programs engaging volunteers in the collection and disposal of tons of litter. A major source reduction and cigarette butt collection initiative called "Protect Our Sand & Sea" was implemented in partnership with the Town of Ocean City from 2019-20. The source reduction component focused on engaging the Town's restaurant/hotel industry in the reduced use of single-use plastic and styrofoam products. The cigarette litter collection component included the deployment of cigarette "Butt Hut" collection receptacles in targeted sites around the Town and the subsequent shipping of collections to an entity that upcycled the butts into various products including benches, some of which were placed in the Town. This component yielded the collection of approximately 500,000 cigarette butts,

More recently, MCBP refocused its efforts on marine debris collection. This effort has been built on the earlier "Ghost Pot" collection project partnering with local watermen in the retrieval of abandoned commercial and recreational crab pots in the Coastal Bays.

These activities evolved in 2022 into an ongoing series of pirate-themed marine debris collection events called "Marine Debris Plunder" engaging community volunteers together with local watermen in the collection of marine debris from the water and land. The 2022-23 events featured the participation of 293 community volunteers and the collection of more than 3,000 pounds of debris from Coastal Bays waterways and shorelines.

Community volunteers' Marine Debris Plunder treasure boat.

Community and Economic Development: Environmental Education During COVID: Bringing the Outside In

The COVID 19 pandemic created major barriers for the delivery of environmental education, particularly given the experiential learning focus of these services. The MCBP team, with critical funding support from the Community Foundation for the Eastern Shore, rose to these challenges with extraordinary innovation and creativity.

The pandemic challenged staff to keep children engaged in the process of learning. Kids were stuck at home with video screens as their gateway to the world. MCBP developed virtual learning modules for students, parents, and teachers that delivered online lessons and companion "resource kits" paired with outdoor activities that could be undertaken from the safety of their neighborhoods.

Examples of these learning modules included:

Journey Up the Coast: A Virtual Exploration of the Coastal and Inland Bays—A two-day virtual tour of these adjacent watersheds for 8–12-year-olds with follow-up in-person field experiences reaching 45 students.

Virtual After-School program—A nine session weekly online program for 10 Berlin Intermediate School students focused on Coastal Bays environmental challenges.

Virtual Service Presentations—Online program providing safe project ideas and guidance for 360 8th graders needing to complete community service requirement.

Give A Day for the Bays—Monthly program reaching more than 200 adults and their families providing suggestions and coaching on opportunities for "giving back" to the watershed through practical outdoor activities.

Resource Kit provided to students participating in COVID-19 era virtual learning program. Photo by Liz Wist.

Ten Years of Data: What We've Learned About the Bays

Long-Term Monitoring of Coastal Bays Health

The Maryland Coastal Bays Program (MCBP) has been working with its partners to maintain a statistically robust and repeatable monitoring program that can be used to track general environmental conditions over the long term. The directed monitoring efforts use four water quality indicators (nitrogen, phosphorus, chlorophyll a, and dissolved oxygen) and two biotic indicators (seagrass and hard clams) to assess the overall health of the bays. These indicators are assessed using science-based ecological thresholds and management goals to understand current conditions and track progress in Coastal Bays health. Indicators are collected by the Maryland Department of Natural Resources (DNR), the National Park Service (NPS), MCBP, and Virginia Institute for Marine Science (VIMS), and data are conveyed to the public through annual report cards coordinated by the University of Maryland Center for Environmental Sciences (UMCES).

Health scores generally improved over the past ten years (Figure 1). However, the improvement was relatively small, with the overall score increasing from 59% in 2014 to 64% in 2023. While overall health scores generally improved in each bay, the St. Martin River and Newport Bay consistently scored lower than other areas. In contrast, Sinepuxent Bay always scored the highest.

The highest scoring indicators were nitrogen and chlorophyll a. Scores for other indicators were considerably lower, and biological health in the bays continues to struggle. Especially disappointing was the demise of submerged aquatic vegetation (SAV) in the northern bays by 2014, but only minor improvement in Chincoteague Bay (Figure 2). Additionally, increases in clam densities in the northern bays were offset by relatively low densities in Chincoteague Bay (Figure 3).

Long-Term Monitoring of Fisheries

DNR Fisheries maintains a long-term monitoring program that tracks fin fish, shellfish and macroalgal abundance. Sampling results were highly variable and showed no clear trends, but clearly illustrated the complex nature of the bays as an important nursery for a wide variety of recreationally and commercially important species.

Focused Research Projects are Vital to Coastal Bays Management

Monitoring data were also collected for a specific purpose or project and reflect a snapshot of conditions. Results of these efforts are compiled and presented every five years in the State of the Bays Report, which is a user-friendly summary of research projects. Many of these projects have provided critical information that has improved our understanding of the Coastal Bays and directly informed management. Below, we highlight some examples to illustrate the importance of these research efforts for the Coastal Bays.

Documenting Successful Restoration

The Lizard Hill seepage wetland project was completed in 2014. This project converted an abandoned gravel mine to a sand seepage wetland supporting an Atlantic white cedar bog community. The wetland intercepts agricultural runoff from entering Bunting Branch, a tributary of the St Martins River. It also serves as an important habitat for a number of wetland dependent species, and contributes to carbon sequestration which is a globally important function. Water quality monitoring at the Lizard Hill seepage wetland has documented over 9,500 lbs of nitrogen removal since its completion in 2014. This water quality monitoring is essential for showing the importance and understanding the benefits of wetland restoration projects.

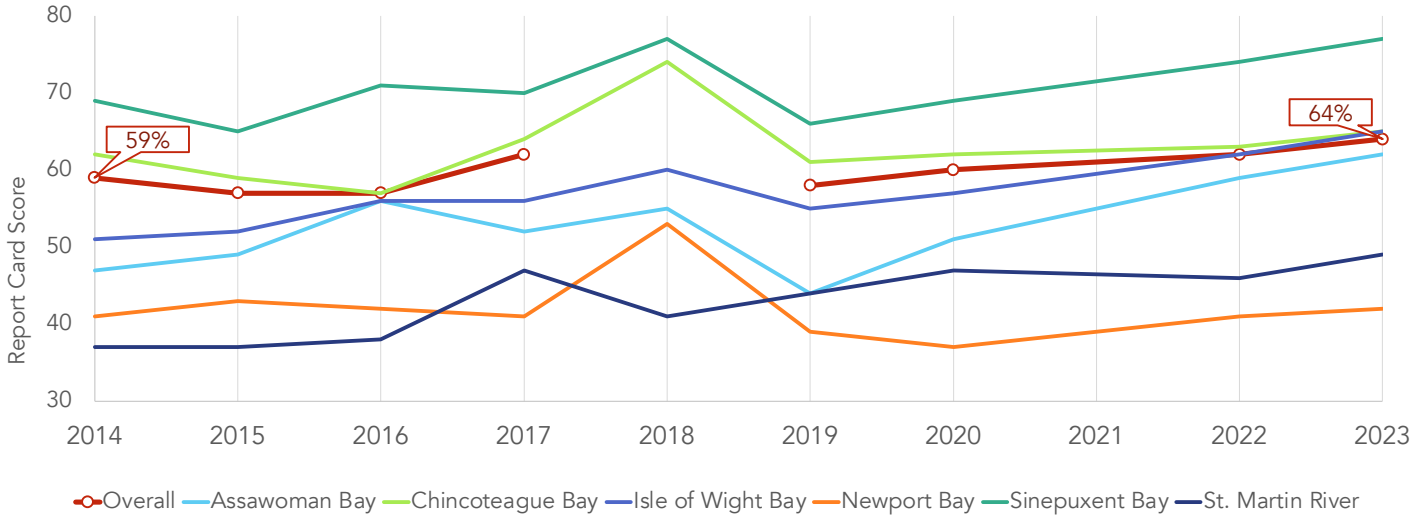


Figure 1. Report card scores for overall and individual bay health.

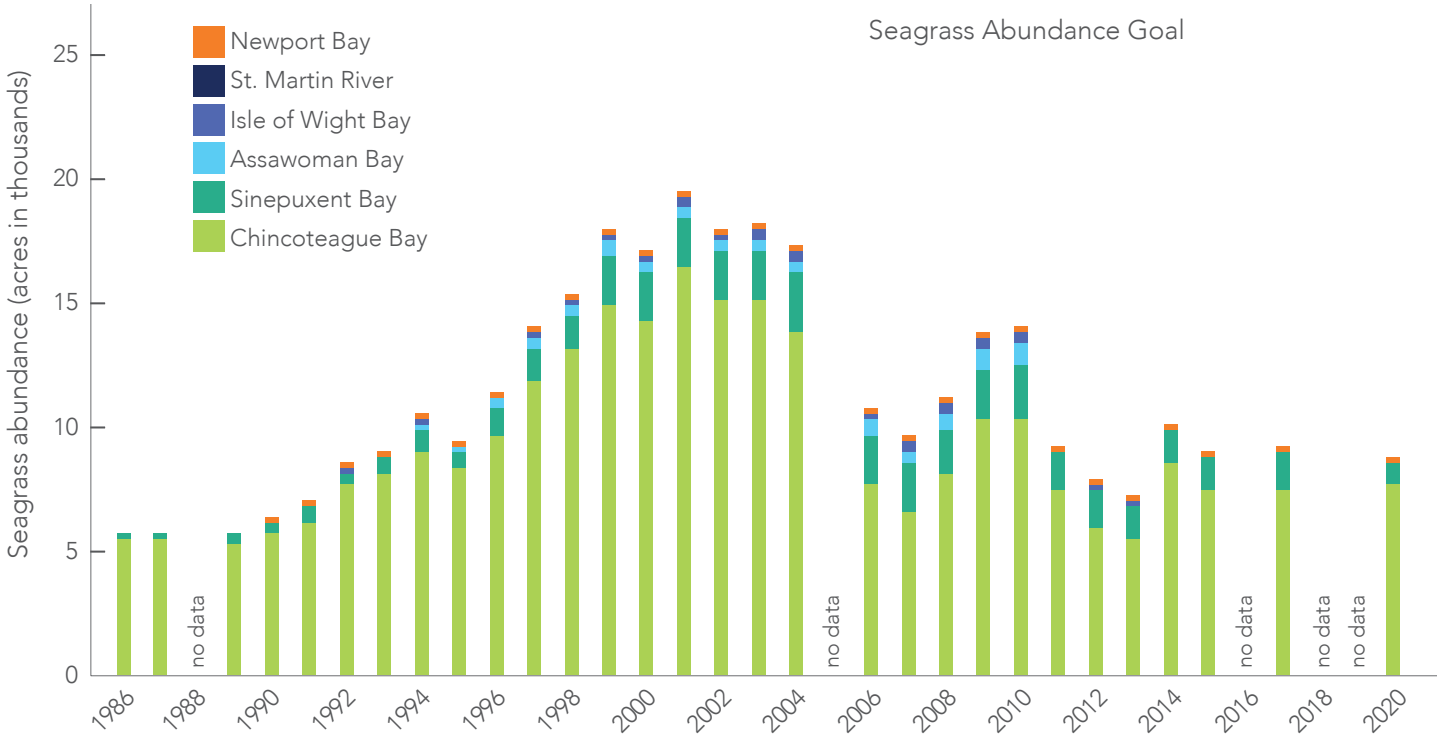


Figure 2. Annual seagrass abundance (acres) vs. seagrass goal. Data from Virginia Institute of Marine Science survey. Recent weather events and poor water clarity have prevented the aerial survey from occurring in 2016, 2018, and 2019.

Improving Habitat Connectivity

Stream connectivity is important in coastal areas to provide access to freshwater spawning areas for a number of fish species that live in salt or brackish water. Monitoring data indicated that the dam at Bishopville on the St. Martin River, the largest freshwater flow into the Coastal Bays, prevented upstream migration for fishes except for American eel. Migrating species such as alewife, white perch, and gizzard shad were prevented from moving to upstream freshwater spawning areas. Innovative modification of the 150-year-old dam in 2014 allowed for fish passage yet maintained the historic mill pond. Subsequent monitoring documented passage of alewife, white perch and gizzard shad.

Documenting Declining Habitat for Birds Informs Restoration

Monitoring tidal marshes and islands by DNR, Audubon, and MCBP revealed significant declines in marsh and island dependent bird species. The decline was associated with tidal marsh and island loss attributed to development and climate change effects such as sea level rise and increased storminess. Innovative methods of evaluating marshes based on the degree of interior flooding of the marsh was developed by the U.S. Geological Survey and are being used to target restoration practices spearheaded by the U.S. Fish and Wildlife Service (FWS). Island restoration is a top priority for future sediment management planning by MCBP, Audubon, and local, state, and federal agency personnel.

Emerging Issues

Elevated nutrient levels were recently found with the presence of bloom forming harmful algal species offshore. This indicates a change in the species composition that is cause for concern and should be used as a baseline for future phytoplankton community analyses and thus supporting coastal monitoring programs (Wolny et al. 2024). In another recent study, the presence of endocrine disruptors in fish and sediment in the coastal bays were found, highlighting the need for monitoring of emergent contaminants (Ali et al. 2022).

Challenges to future monitoring efforts include increasing costs of continuing to maintain long-term sampling programs, incorporating new technologies that need to dovetail with existing but dated technology, and taking on additional monitoring duties as emerging issues and contaminants become known.

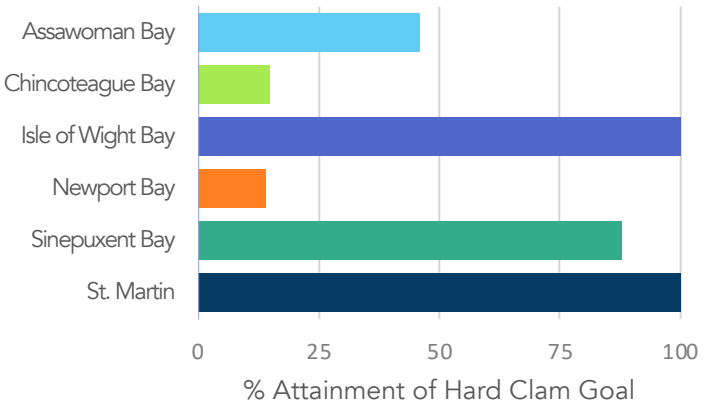


Figure 3 (right). January 2024 progress towards clam density goals. St. Martin River and Isle of Wight Bay not only met but exceeded their hard clam goals, but Chincoteague Bay and Newport Bay continue to score poorly. Data courtesy of MD DNR.

MCBP Management Conference

Led by a Policy Committee composed of federal (EPA, National Park Service) state (Departments of Environment, Natural Resources, Agriculture and Planning) and local (Worcester County, Berlin and Ocean City) government entities and guided by the Foundation Board, Implementation, Science and Technical Advisory and Citizen Advisory committees, this framework has governed and guided MCBP through 28 years of service. (See Management Conference organizational chart below.)

The Management Conference (MC) serves to review and approve annual workplans and budgets for both regular U.S. Clean Water Act Section 320 grants and Bipartisan Infrastructure Law (BIL) funding, provides guidance on programmatic focus, priorities, projects and activities, and assists in identifying and navigating trends, opportunities and challenges faced by the Program.

The original CCMP for the Coastal Bays organization identifies an organizational structure dependent on improving efficiency, being consensus driven, and increasing opportunities for citizen involvement. This organizational connection among the various Committees has served MCBP well for over 28 years of program implementation.

The Policy Committee (PC) is a network of governmental and community leadership at the highest-level working to achieve the purpose of the MCBP. This Committee was originally identified as central for providing broad policy direction for the program, approving priorities for CCMP implementation, seeking, and developing funding sources to conduct the CCMP, and approving changes that further the goals of the CCMP.

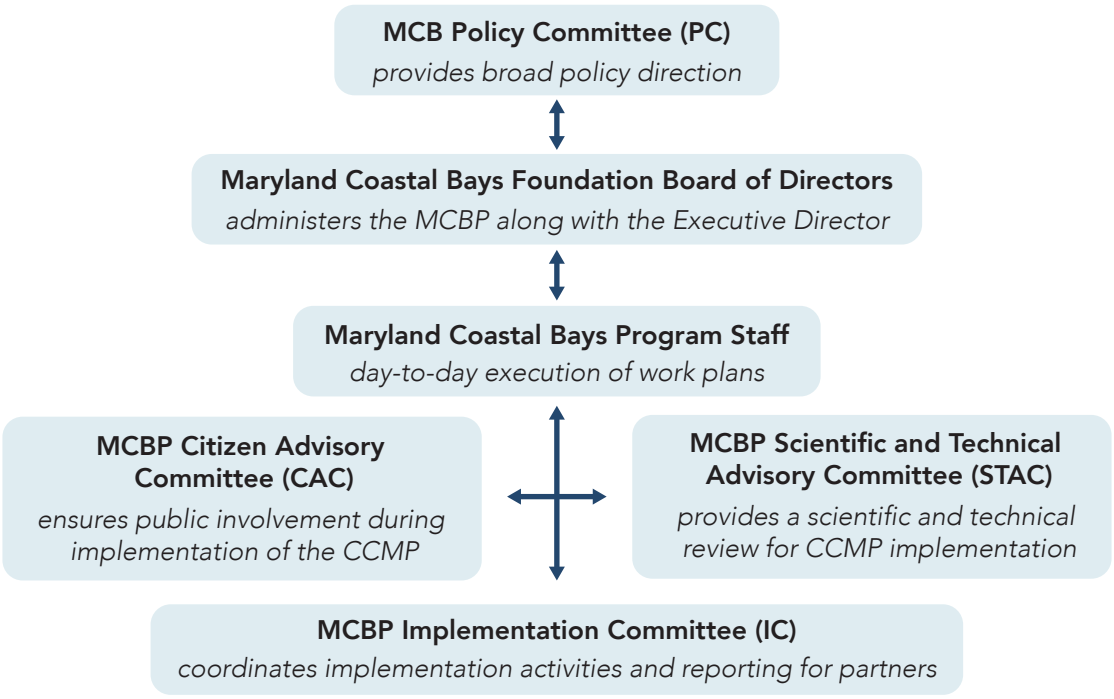
This committee meets annually and provides a forum for bay-related issues to be discussed providing resource officials and the public with information necessary to make informed decisions about the management of the Coastal Bays.

The Coastal Bays Foundation is the non-profit organization responsible for the administration of the Maryland Coastal Bays Program. The Foundation does not establish policy, but is intended to be administrative, guiding the development of the annual workplan as well as budget oversight. The Board of Directors guides organizational growth to support and implement the long-term management plan for use and enhancement of the natural resources of Maryland Coastal Bays and its associated watershed.

The Board of Directors meets monthly along with the Executive Director to review finances, program accomplishments, discuss progress on current initiatives and conduct business throughout the fiscal year. Staff are invited on a rotating basis to present their work on various CCMP related programs and projects to allow the Board to stay informed.

The MCBP Program staff are divided into five sections—Administrative, Science and Restoration, Education and Outreach, Development and Communications and Watershed Management. The program staff is augmented throughout the year with interns, special limited hires through programs such as the Chesapeake Conservation Corps, and seasonal staff.

Management Conference Organizational Chart



Led by the Executive Director, who works directly with the Foundation Board, the staff is responsible for conducting the actions within all program workplans. In cooperation with program partners and committees, staff interaction is interwoven in all aspects of CCMP implementation.

The Executive Director is also the liaison between the Board and staff regarding program policies and procedures.

The Implementation Committee is a standing committee comprised of partner organizations and federal, state, and local agencies who directly fulfill the goals and actions of the CCMP.

Through regular meetings (2-3 times a year), this committee discusses progress and oversees implementation of the CCMP. The Committee develops the implementation tracking reports provided to MCBP for the purpose of reporting progress to the public and Policy Committee.

MCBP staff are engaged with many of the programs and projects undertaken within the Implementation Committee, and this relationship helps to coordinate activities and ensure that progress is evaluated for CCMP milestones and performance measures.

The Scientific and Technical Advisory Committee (STAC) is comprised of the region's most knowledgeable natural resource scientists and is responsible for providing important scientific information for program decision-making. Through STAC, quarterly meetings are held where the staff and STAC work together with input from the IC and CAC on development of a science agenda and related workplans. These coordinated efforts move the program forward with research, monitoring and defining elements of climate science, as well as completing projects aimed at improving water quality and habitat restoration throughout the Coastal Bays.

The Citizens Advisory Committee (CAC) includes various stakeholders in the watershed interested in furthering the goals of the Coastal Bays Program. Local fisherman, developers, golf course professionals, business owners, community associations, recreational bay users, farmers and environmentalists work together for the same outcomes to protect the Coastal Bays. The CAC coordinates with the MCBP Executive Director, program staff liaison as well as a Board representative to ensure public involvement during implementation of the CCMP.

Regular meetings (2-3 times a year) of the CAC also provide a forum for discussion about citizen involvement in outreach efforts, environmental advocacy, and areas of legislative interest.

MCBP Management Conference is led by the Policy Committee composed of partner agency leadership.

Management Agreement

Whereas, Maryland's Coastal Bays are a treasured national resource and should be managed and protected for current and future generations; and

Whereas, Maryland Coastal Bays Program is one of 28 National Estuary Programs recognized by the Environmental Protection Agency as a place-based program to protect and restore the water quality and ecological integrity of estuaries of national significance; and

Whereas, The Maryland Coastal Bays watershed is affected by actions in many communities, by activities of many individuals, and by decisions made by many agencies and organizations; and

Whereas, Cooperation and commitments between federal, state and local governments, and other partner organizations is essential to meeting the goals of the Maryland Coastal Bays Program and implementing the Comprehensive Conservation & Management Plan.

Therefore, The Undersigned hereby resolve to support the Maryland Coastal Bays Program as it oversees CCMP implementation; to endorse the CCMP and its implementation; and to work diligently, to the extent practicable, to implement the actions for which their agency or organization is responsible.

(Placeholders for partner signatures)

Key Local Stakeholders Are Vital to CCMP Implementation

Local watershed stakeholders play a crucial role in the success and sustainability of our Coastal Bays Management Plan. Our stakeholders include a diverse range of individuals and groups, including local communities, government agencies, non-governmental organizations (NGOs), school groups, businesses, and citizen volunteers, each contributing unique perspectives and expertise. Our stakeholders provide valuable local knowledge about the conditions, historical changes, and ecological dynamics of our watershed. This expertise is essential for understanding and addressing the challenges we face together.

Over the past ten years, volunteers have dedicated thousands of hours to removing invasive species, participating in trash clean-up campaigns, assisting in outreach events, participating in community science initiatives, and more. Our volunteer community is immeasurably valuable, and the Maryland Coastal Bays Program is grateful to the hundreds of people who have contributed to the success of our organization over the years!

Top: Sun Communities' Castaways education program.

Since 2009, MCBP has highlighted the amazing work of our stakeholders through Gold Star awards presented in our annual Coastal Bays Report Card publication. Some notable examples from the past ten years are highlighted below.

- 2015: Maryland farmers planted a record-setting 492,244 acres of cover crops as part of the Maryland Department of Agriculture's Cover Crop Program. Cover crops are one of the most economically and environmentally viable ways for farmers to meet nutrient and sediment reduction targets.
- 2016: The Ocean City Reef Foundation has placed almost 15,000 concrete blocks at eight sites offshore of Ocean City, creating artificial reefs that provide habitat to many species. These reefs also benefit fisheries, attracting sport fishes like black sea bass, tautog, and summer flounder.
- 2017: Through a partnership with Sun Communities' Castaways RV Resort and Campground, MCBP's education team has provided free summer programs on Castaway's bayfront beach for over 8 years. These educational seining programs provide hands-on learning opportunities about the Coastal Bays for people of all ages.
- 2018: The Ocean City chapter of the Surfrider Foundation launched the "Strawless Summer" campaign, encouraging restaurants and visitors to go straw-free to reduce the volume of single-use plastic in the waste stream. This initiative kickstarted a multi-year source reduction campaign in Ocean City.
- 2019–2020: Since 2018, the Protectors of the St. Martin River have worked to improve the health of the St. Martin River through oyster gardening. This organization has built oyster cages, donated thousands of oysters to MCBP for restoration, and expanded the oyster gardening community in our watershed.
- 2022: The Worcester County Public Schools have been expanding their environmental literacy plans, incorporating local ecology and challenges into science curriculums. WCPS also supports the MCBP high school leadership and career development program: the Worcester Environmental Training, Leadership and Stewardship (WETLANDS) Retreat.
- 2023: Baywater Seafood is the first bay scallop farm in Maryland, and has worked closely with researchers to track and reintroduce bay scallops in the Coastal Bays. Baywater has also partnered with MCBP on outreach and education events to raise awareness on the importance of sustainable aquaculture.

Thank You to Our Partners: Ten Years of Collaboration

Effective implementation of the CCMP over the past decade has only been possible through the collaborative effort of many partners led by: federal agencies, including the Environmental Protection Agency and National Park Service; Maryland state agencies, including the departments of Natural Resources, Environment, Planning, and Agriculture; local government entities, including Worcester County, Town of Ocean City, Town of Berlin, and Ocean Pines Association; and numerous other public, private, and nonprofit organizations with a stake in the protection and enhancement of the Coastal Bays watershed.

Partner inputs have included dedicated staff time, financial assistance in the form of grants and matching contributions, and other shared resources. Taken together, this collaborative investment in the Coastal Bays has generated significant dividends in terms of clean water, healthy habitats and resilient communities.

Implementation of the new CCMP over the next ten years promises to engage more diverse partners, leverage increased investments, and deliver improved results.

Thank you to our partners for all you have done and all that we will continue to do together!

What to Expect in the Rest of this Document

The 2025 CCMP is presented in a format that highlights each of the four Themes, twenty-one Goals and 124 Actions. The Plan is structured this way to provide an overview of the Themes; Provide Healthy Waters, Protect Fish, Wildlife and Their Habitat, Create Resilient Communities and Ecosystems, and Develop Public Engagement and Partnerships. The Themes each offer active descriptions of the intent of the Theme.

The latter two Themes, highlighting climate resilience and public engagement, reflect issues that have become increasingly prevalent in MCBP's work and are priorities for EPA nationally. Within the public engagement focus, there is a particular emphasis on diversity and outreach to disadvantaged and underserved communities. The focus on climate resilience is informed by the Program's development of a Climate Change Vulnerability Assessment and Climate Adaptation Action Plan. This Action Plan is included as a table at the end of this CCMP document with references to new CCMP Actions reflecting climate adaptation priorities. The significance of these climate resilience plans and their integration into the CCMP are further discussed in the Supplemental Plans and Strategies section on page 86 of this document.

The Themes in the revised CCMP are the umbrella under which are placed important Goals and Actions for implementation of the Plan. The Goals and Actions for each Theme vary in number by design and are distinct in how they serve that Theme. It was decided early in the revision process that there would not be a "template" for how many Goals or Actions would be set up under the four Themes. Rather, those components came into place as the document looked forward from the current 2015 CCMP, and how best to carry out the conservation and protection of the coastal bays.

As each Goal in the CCMP is described, hopefully it becomes clear to the reader why they were chosen to support each Theme. The Actions for each Goal are listed as well. For brevity and ease of reading, only the Action itself is listed under each Goal. The complete list of required elements for each Action is provided in a table as an Appendix to the CCMP. For each Action in the CCMP, there is included the Responsible Entities, Timeframe and Key Milestones, Cost Range and Funding, and Performance Measures.

Actions in the CCMP are developed to further inform the Annual Workplan for the MCBP. When the Workplan is being developed each year, the staff, and Management Conference including all the Committees, are consulted on how to best continue to execute the important Actions in each Goal. EPA has final approval of that workplan each year and reviews for consistency with the CCMP to ensure the workplan reflects that roadmap of the MCBP in all areas of its implementation.

Other specific elements of the CCMP that EPA needs to be included either as a Chapter or a separate document, include a Monitoring Plan, Finance Strategy, Habitat Protection/Restoration Strategy and Communication/ Outreach Strategy. They are included as a supplement to the main body of the CCMP.

Included also as a required part, is a crosswalk of CCMP revisions allowing a comparison of the 2015 CCMP to the revised 2025 document. The crosswalk allows the reader to easily see the changes in the two documents in their structure, and how and why changes were made during the revision.

Finally, because of future climate considerations and the resiliency necessary for the program's success, the MCBP Climate Change Action Plan is included as a supplement to the CCMP.

THEME 1

PROVIDE HEALTHY WATERS

Water is the lifeblood of the Coastal Bays. Its network of bays, necks, creeks, and streams define this coastal region. Whether boating, fishing, crabbing, parasailing, or simply laying on a beach, water is the tie that binds the Coastal Bays together. It is no wonder that the quality of water in the Coastal Bays is the most important factor in maintaining a healthy and diverse ecosystem. The Coastal Bays watershed supports vibrant human and biological communities alike, and fuels the State of Maryland's largest tourist economy. The Bays watershed directly or indirectly supports over 50,000 jobs and over $1.5 billion in annual wages. All of this depends on swimmable and fishable waters. In fact, all of the other focal areas of this CCMP—Provide Healthy Waters; Protect Fish, Wildlife, and their Habitat; Create Resilient Communities and Ecosystems; and Develop Public Engagement and Partnerships —depend on this single critical factor.

The greatest threats to water quality are nutrient over-enrichment and climate change. Nutrients, especially nitrogen and phosphorus, enter the water column from a wide range of point and non-point sources. Non-point sources include runoff from urban areas, agriculture, septic systems, groundwater, atmospheric deposition, and natural sources such as wetlands, marshes, forests and eroding shorelines. Point sources include drainage ditches and wastewater treatment plants. Nutrients fuel plants, which in turn feed other organisms such as shellfish, fish, birds, and mammals.

Microscopic plants, phytoplankton, are the base of estuarine food webs. However, too-high concentrations of algae can lead to a reduction in water clarity and dissolved oxygen when the algae respires at night and consumes the oxygen that was created during the day. The oxygen depletion can create unsuitable conditions for organisms such as fish and shellfish.

The Coastal Bays region is expected to experience an increase in precipitation along with an increase in the frequency and intensity of extreme storm events. This will undoubtedly lead to more flooding and higher levels of runoff. Furthermore, climate change is expected to increase water temperatures, which, paired with excess nutrients, will promote the growth of very small phytoplankton. Phytoplankton are especially proficient in using nutrients, and can proliferate excessively, producing harmful algal blooms (HABs). Macroalgae, sometime called seaweed, also is especially adapted to nutrient uptake. It grows very quickly and tends to smother seagrasses. Decreasing nutrient inputs will reduce the chances of HABs and facilitate the recovery of seagrass beds, despite climate-related stressors. Therefore, MCBP must reduce nutrient loading by meeting the Total Maximum Daily Load (TMDL) goals set in each of our Bays.

The bays and their tributaries are not the only water sources threatened by point and non-point sources of pollution. Our groundwater sources are also at risk of contamination. The entirety of the population in the Coastal Bays is solely dependent on groundwater for drinking water, agricultural irrigation, and industrial/business needs. There are 47 wells that supply Worcester County's 35 nontransient systems. These wells are split between 16 confined and 31 unconfined aquifers. Confined aquifers are deep and typically are not affected by surface contaminants. However, unconfined aquifers are shallow and are at risk of contamination from both point and nonpoint sources. Outside of public wells, there are hundreds of private wells in Worcester County that use tens of millions of gallons of water daily. Ensuring we are responsibly using and protecting our groundwater resources is important to our current and future generations' health and livelihoods.

Since the inception of the Coastal Bays Program, Worcester County and the towns of Berlin and Ocean Pines, along with state and federal partners, have made remarkable strides towards improving the water quality of the Coastal Bays through progressive zoning, protection and restoration of wetlands, the elimination of point sources of pollution, stormwater management, and implementation of state and federal measures to reduce both agricultural and residential run-off. Planned practices will achieve Total Maximum Daily Load (TMDL) requirements for nitrogen and phosphorus in Sinepuxent Bay.

Over the next ten years the Coastal Bays will have several strategies and plans in place that will allow us to reach TMDL goals in each of the Bays and expand monitoring efforts to improve the management. Achieving these goals will improve water quality conditions in the watershed and protect its natural resources. Challenges will be met by implementing numerous monitoring programs, restoration projects, and education and outreach opportunities using the best available technology and innovative techniques.

In this section, we look at ways to:

1. Reduce Nutrient and Pollutant Loading in the Watershed
2. Protect and Conserve Groundwater
3. Develop and Implement Comprehensive Watershed Programs and Strategies to achieve TMDL Goals

These actions will facilitate implementation of a strategy to meet TMDL goals for all the waters in the Coastal Bays.

A view looking north along Sinepuxent Bay. Photo by Jane Thomas, IAN Image Library.

Goal 1. Reduce Nutrient and Pollutant Loading in the Watershed

The Maryland Coastal Bays watershed is largely made up of agricultural land use and is projected to become more developed over the next ten years. Urban and agricultural lands are the greatest nonpoint source contributors to nutrient and pollutant loading in our watershed. Projected population growth will inevitably impact the health of our watershed as atmospheric deposition from air pollution, nutrient loads, and other harmful substances (PFAS, microplastics, and endocrine disruptors) become more prevalent.

It is likely that forests and wetlands will either decline or become more stressed as development increases. These habitats are critical to providing healthy waters since they act as natural buffers by filtering out excess nutrients, pollutants, and other harmful toxins that run off from nearby agricultural and developed areas. In addition to impacts on these ecosystems caused by humans, current models predict future declines in these habitats due to sea level rise, climate change, and saltwater intrusion. As a result, it is critical that our organization and partners work with our community to mitigate the current and future threats that will negatively affect the health of our watershed.

Even with the future projections, reducing nutrient and pollutant loading in our watershed can be done. The best way to accomplish this goal is to identify, monitor, and allocate resources towards the point and non-point sources that are contributing the most nutrients and harmful pollutants to our waterways. There is existing guidance in the TMDL showing the nitrogen and phosphorus reductions that are needed in the Coastal Bays (Figure 4). Collaborating with our farming community and local municipalities to implement best management practices can lead to a reduction in the use of fertilizers, an increase in riparian buffers, improvement of septic and wastewater treatment, and proper disposal of hazardous materials. Relying on our partners to collect data that will provide insight on the transport and effects of PFAS, endocrine disruptors, and microplastics will be vital in developing reduction strategies and management decisions. Additionally, encouraging the County to allocate funding towards improving current septic systems and maintaining the policy of no new wastewater treatment plant discharges is critical in achieving this goal.

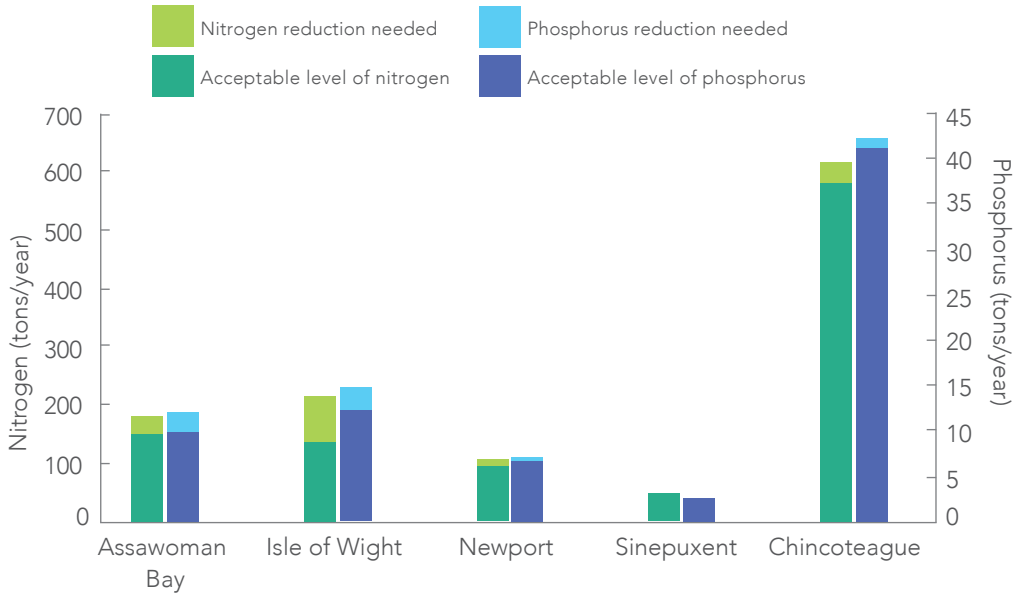


Figure 4. Nitrogen and phosphorus levels and the amounts of reduction needed in order in order to meet water quality goals.

Action Items

1.1 Provide funds and incentives to establish, improve, replace and maintain septic systems with Best Available Technology.

1.2 Promote meaningful interstate cooperation for nutrient reduction through watershed based planning strategies.

1.3 Protect and increase wetlands and buffers in riparian zones and stream corridors.

1.4 Partner with local farmers and Public Ditch Associations (PDAs) to develop and implement farm specific land conservation and Nutrient Management Plans (NMPs) utilizing federal and state cost share programs and loans.

1.5 Continue to support the Clean Marina Initiative including technical assistance and outreach materials on pollution prevention.

1.6 Quantify the volume of water and nutrients delivered from watershed ditches to the Coastal Bays to prioritize for nutrient reduction.

1.7 Maintain the policy of no new wastewater treatment plant discharges to waterways, and facilitate removal of point sources while requiring spray irrigation or other technologies instead.

1.8 Provide environmental data and analyses collected offshore to inform coastal researchers about nutrient loading dynamics that affect the Coastal Bays through inlet flushing.

1.9 Determine trends in air pollution inputs from the National Atmospheric Deposition Program monitoring site.

1.10 Conduct hazardous waste disposal programs for farm and residential hazardous materials.

1.11 Identify the sources, loadings, fate and transport, and develop reduction strategies for emerging contaminants including Per- and polyfluoroalkyl substances, PFAS, endocrine disruptors, and microplastics.

The removal of the Bishopville dam provided opportunities for anadromous fish passage and provided more ecologically robust and resilient stream and riparian corridor. Photo by Keith Pivonski.

Goal 2. Protect and Conserve Groundwater

The Coastal Bays region is solely dependent on groundwater for public drinking water supplies. Groundwater is also the source for agricultural irrigation, industrial/business needs, and much of the freshwater that flows into the bays. There are 40 public wells and hundreds of private wells that are capable of providing 31 million of gallons of water per day. Future growth projections indicate that the use of groundwater in the Coastal Bays watershed will climb to as much as 37 million gallons per day. The shallow, unconfined aquifer of the watershed is very susceptible to both point and non-point source contamination from fertilizers, pesticides, septic effluent, and other sources, and can also be impacted by drought and salt water intrusion. The lag time from actions taken on the land surface and reaction within the water column has been estimated to be less than 10 years, near the surface, but up to over 100 years in deeper aquifers.

Action Items

2.1 Update the USGS surficial aquifer model with other known studies such as thermal imaging to prescribe solutions for water protection.

2.2 Fund continued monitoring of nutrient inputs to the Coastal Bays from groundwater.

2.3 Monitor and assess changes in Assateague Island groundwater resources related to climate variability.

2.4 Assess and report on quantity and quality of groundwater resources available for the Coastal Bays watershed.

2.5 Consider development of technology and standards to advance graywater reuse.

The installation of wells to monitor groundwater gives information about the concentration of nutrients in the groundwater.
Photo by Roman Jesien.

Groundwater is the source for all drinking water and agricultural irrigation in the Coastal Bays watershed. Photo by Chris Parypa.

A central pivot irrigation system. Photo by Frank Liebig, Wikimedia Commons, CC BY-SA 3.0 DE.

Goal 3. Develop and Implement Comprehensive Watershed Programs and Strategies to achieve TMDL goals

The Clean Water Act of 1972 required all bodies of water identified as impaired under EPA to develop Total Maximum Daily Loads (TMDLs). TMDLs are the maximum amount of pollutants allowed to enter a waterbody so that the waterbody will meet and continue to meet water quality standards. Since all five of the Coastal Bays are considered impaired, it is imperative that strategic plans are developed for each subwatershed to meet TMDL goals. Reducing nonpoint sources of nitrogen, phosphorus, and sediment are the main reasons for developing and implementing strategic watershed plans.

These plans outline the primary nonpoint sources of pollution, management strategies, resource needs, and projects that will occur to ensure TMDLs are met for that subwatershed. Additionally, they provide timelines as to when projects and initiatives will take place to ensure goals are being met on schedule. Although TMDL standards have been established by EPA for decades now, four out of the five Coastal Bays subwatersheds still do not have approved Comprehensive Subwatershed Plans.

The approval of a Comprehensive Subwatershed Plan depends largely on EPA deciding whether ongoing water quality monitoring efforts provide enough data to determine the health of the Coastal Bays. The Assawoman Bay plan was approved in 2019 and showed that the efforts of the six organizations monitoring our waterways were adequate in accurately depicting trends in water quality. As of 2019, Assawoman Bay needed an additional 5,387 lbs of nitrogen removed annually to meet TMDL goals. The data summarized in these reports provides enough information to create a unique prescription that identifies where best management practices (BMPs) must be implemented to achieve healthy waters for current and future generations. Reducing the number of state-listed impaired bodies of water and reaching TMDL goals in the Coastal Bays is achievable through the development of these Comprehensive Subwatershed Plans.

"Maryland Coastal Bays Program has been a tremendous partner in our efforts to address stormwater management challenges in the Town of Berlin. MCBP and its partners have helped the Town reduce flooding in our neighborhoods while improving water quality as it drains into Newport Bay."

— Zackery Tyndall, Mayor, Town of Berlin

Action Items

3.1 Develop and implement Non-Point Source Management (A-I) Plans for all sub-watersheds in the Maryland Coastal Bays including plans requiring interstate coordination.

3.2 Collect and report data for existing and future BMP's, including Agriculture, to track progress toward the successful implementation of the subwatershed plans, and allow for adaptive management.

3.3 Fund and implement retrofits, improvements and long-term maintenance of conveyances, structures and natural landscapes for stormwater management.

3.4 Evaluate a tracking approach for land use indicators including but not limited to land use/land cover, impervious surfaces, amount of development occurring inside & outside of County Growth Areas/Priority Funding Areas, and other land use and growth metrics.

MCBP retained Straughan Environmental and Ecotone to conduct an assessment of the southern sub-watersheds to identify sites for non-point source nutrient reduction opportunities.

THEME 2

PROTECT FISH, WILDLIFE, AND THEIR HABITAT

The Coastal Bays and ocean waters support a variety of shellfish and finfish species of commercial and recreational value (the state controls waters out to three nautical miles offshore and federal waters extend from there out to 200 nautical miles). Most marine species of interest to the region spend at least part of their life cycle in the Coastal Bays, but may live offshore during other stages. Therefore, many species are managed at the regional level through cooperative efforts among states. Maryland also manages fisheries resources within the Coastal Bays and waters of the state. Management controls include commercial quotas, permit and license requirements, gear and time of year restrictions, and size and catch limits. The most substantial commercial and recreational fishing activity in the Coastal Bays is for blue crabs, summer flounder, striped bass (rockfish), sea trout, hard clams, Atlantic croaker, white perch, tautog, and bluefish.

Factors important to the health of the Coastal Bays fish and shellfish are habitat and water quality. Degradation of benthic habitat from warming waters, seagrass loss, nutrient overenrichment, reduced light penetration, and impacts from boating activities affect shellfish and many juvenile finfish species. Chemical contamination in dead-end canals (which receive contaminated runoff from developed areas, pilings, and boats) also contributes to degraded sediment quality. Shoreline erosion due to sea level rise, runoff, and boat wake also degrades water quality and aquatic habitat. In addition, hard shoreline stabilization methods reduce the habitat value of shorelines, essential for small fish, horseshoe crabs, birds, and terrapins. A dam modification effort has also recently helped anadromous fish population by allowing access to upstream spawning habitat. However, streams and tributaries in the Coastal Bays watershed continue to exhibit a high level of habitat and water quality degradation due to ditching and lack of buffers.

Submerged Aquatic Vegetation

Submerged aquatic vegetation (SAV; seagrass beds) are a particularly important resource in the Coastal Bays, providing habitat for fish and shellfish and food for aquatic species and birds. Eelgrass, the dominant species of SAV, was wiped out in the 1930s due to an eelgrass blight. Between 1986 and 2001, seagrass populations increased substantially but declined again beginning in 2002 and today are back down to pre-1986 levels. Unusually warm summers and high phosphorus levels have eliminated SAV beds in the northern beds and maintained sparse beds in the southern bays. A combination of heavy macroalgal growth, turbid water, and struggling water quality combine to limit its growth.

Threatened and Endangered Species

The Coastal Bays are home to a broad variety of species. A number of these are threatened and endangered including three bird, two insect, 14 other animal, and 89 plant species. In most cases, their threatened status is due to habitat loss and invasive plants. Of particular concern have been drastic declines in saltmarsh dependent birds (e.g., saltmarsh sparrow and black rail) and island-dependent birds (state endangered black skimmer, royal tern, and common tern). Population declines have ranged from 68% to 99% since the 1990s and are primarily due to loss of island and marsh habitat. Such losses are strong evidence that climate change has and will continue to have major impacts on the Coastal Bays.

Forests

Loss of forestland disrupts habitat corridors for many bird and wildlife species and can impact water quality in the Coastal Bays. Forests filter sediments from water, limit erosion by protecting soils and take up nutrients. The character or composition of a forest—its individual tree and shrub types, their sizes, ages and population densities—also affect the forested habitat for many species of plants and animals. Forest character and functions are altered when native forests are converted to pine monoculture or development. Deer, invasive plants, disease, and pest infestations can also alter forest character and functions. Although timber production plays an important role in the regional economy and in the overall protection of the watershed, biological diversity within forests is reduced substantially with pine production. Appropriate management of forested lands, particularly those in timber production and unharvested forests, is necessary to retain large, diverse forest tracts that support wildlife habitat needs. Additional forest management options can promote old-growth timber, increased hardwood production, or eco-tourism activities. Land managers are also encouraged to hold property in grasslands and early successional states due to the loss of so many species dependent upon these habitat types, including northern bobwhite quail.

Wetlands

In addition to forest and field habitat losses, tidal and non-tidal wetlands have decreased substantially, especially in the northern bays. Wetlands play an important role in habitat, buffer coastal storms, treat sediment and nutrient runoff, absorb flood waters, and maintain adequate water quality for all inhabitants of the Coastal Bays. The draining and clearing of wetlands for agriculture, development, and other human uses decreases habitat for wildlife and adversely affects the land's nutrient and sediment absorbing potential (e.g. buffering capability). Tidal wetlands are also succumbing to land subsidence and sea level rise causing shoreline erosion and interior flooding. Although habitat losses have slowed considerably due to federal and state laws restricting impacts to wetlands, losses still occur from changes in land use, alteration of hydrology, and processes brought about by climate change, including shoreline erosion and interior flooding.

Islands

Islands in the Coastal Bays play a similar role in protecting mainland areas and providing habitat to iconic species like horseshoe crabs, terrapins, and coastal waterbirds. Over 50% of all coastal waterbird species use islands as nesting grounds. Since 1989, the Coastal Bays have lost 14 islands, all of which were considered critical nesting and spawning grounds for numerous species. Several factors have contributed to island loss. Like tidal wetlands, islands are also affected by sea level rise, increased inundation, and erosion from wave energy. However, other factors such as the dredging of navigational channels and hardening of shorelines have further contributed to island loss due to altered sediment transport mechanisms.

Summary

In this section, the following are addressed: management of recreational and commercial fisheries; the protection of marine resources; seagrass, wetlands, island, and shoreline restoration; forest conservation; and the monitoring and protection of wildlife. The fish and wildlife actions rely heavily on existing resource management programs to meet current standards, catch limits and other requirements.

Bald Eagles were once labeled as Endangered in Maryland but made a tremendous comeback after a ban of the pesticide DDT. They are now thriving near the shorelines and wetlands of the Coastal Bays.

Goal 1. Develop and Implement a Comprehensive Monitoring Plan and Habitat Protection/ Restoration Strategy

The Ecosystem Monitoring Plan, to be produced by STAC, will describe specific details of monitoring the species and habitats in the watershed. It will outline specific monitoring needs, goals, and measures of success. As the National Estuary Program, it is MCBP's responsibility to ensure all partners and community members are all working towards the same objectives to achieve monitoring and habitat management goals.

The Ecosystem Monitoring Plan and Habitat and Restoration Strategy will be reviewed annually to ensure monitoring efforts meet current and future needs. This plan will be developed, approved, and implemented by STAC, which has traditionally provided advice and guidance on research, data management, modeling, and monitoring efforts in the Coastal Bays. Establishing annual reviews will reinforce collaboration and promote the sharing of resources. The plan will be adaptable so that it can evolve as the environmental issues, impacts, and solutions evolve. Additionally, the periodic review will aid in the evaluation of the overall effectiveness of management practices.

Action Items

1.1 Develop sustainable funding for all monitoring needs as a necessary component of the MCBP Monitoring Plan and Finance Strategy.

1.2 Ensure that the recommended components within the Monitoring Plan, and Habitat and Restoration Strategy are considered each year for implementation in the MCBP and other partner's annual work plans.

MCBP has been collecting a variety of data relating to diamondback terrapin populations in the Coastal Bays. Organized terrapin headcount surveys began in 2012 in collaboration with Maryland DNR. Photo by Jane Hawkey, IAN Image Library.

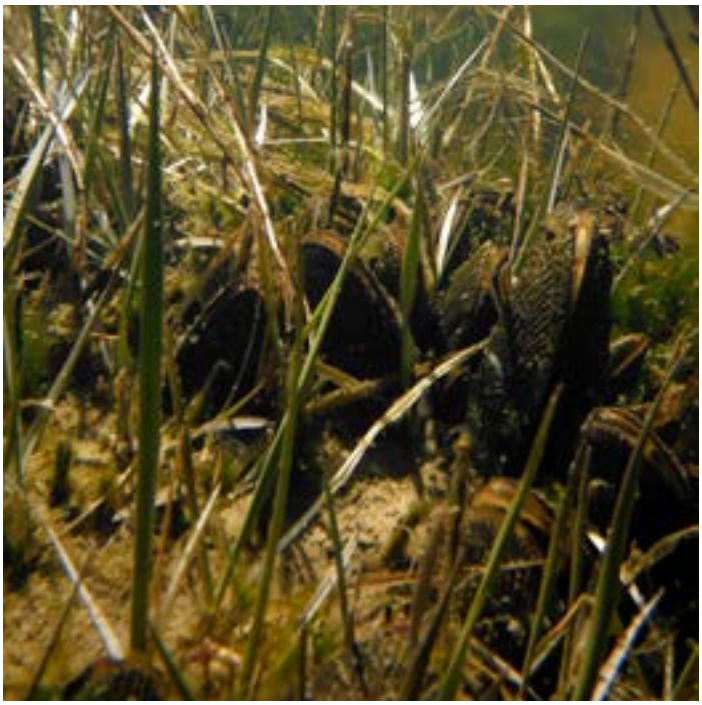
Goal 2. Monitor and manage finfish, shellfish, and other aquatic species

Maryland's Coastal Bays provide critical habitat for finfish, shellfish, and other aquatic species such as horseshoe crabs and diamondback terrapins. Many of these species are of major local commercial and recreational importance. The economy of the Coastal Bays watershed relies upon healthy fish stocks. Currently, finfish populations are stable in the Coastal Bays. However, species abundance and species diversity may be negatively affected by climate change, sea level rise, habitat degradation, and pollution from land use activities. Survey data indicates that annual surface water temperature has been increasing since 1995.

Species of shellfish, including eastern oysters, bay scallops, and hard clams, have also faced historic declines due to overharvesting and disease. Their current populations are at a fraction of the historic benchmark. Despite the current lack of harvest pressure, these species may need decades for their populations to return to historic density. The future is uncertain for populations of finfish, shellfish, and other aquatic species. However, it is likely that many populations will face declines if action is not taken to reduce habitat loss, pollution, and surface water temperatures.

It is important that MCBP collaborates with partner agencies to continue monitoring and sustainably managing important finfish, shellfish, and aquatic species in the Coastal Bays. Supporting Maryland DNR so they may continue to provide annual stock assessment data, harvesting thresholds, and fish abundance targets will help the Coastal Bays meet management goals and objectives. The annual survey data collected by DNR is essential to understanding whether we are managing the species populations and threats to their success effectively. They also help us remain proactive in addressing population declines and threats.

The aquaculture and commercial fisheries industries are extremely valuable to our local economy and culture. In fact, it is believed that bay scallop farming in the Coastal Bays has contributed to the increase in bay scallops in survey locations sampled in the 2024 shellfish survey. MCBP will continue to promote responsible commercial fishing and aquaculture farming businesses by providing education on best practices to those in the industries and the community.



Hard clams are an important shellfish in the Coastal Bays.
Photo by Travis Turnbaugh.

Action Items

2.1 Work with partner agencies to manage and provide stock assessment data for recreationally and commercially important finfish and shellfish species to the targets and thresholds described in state and federal fisheries management plans.

2.2 Continue to improve the quality and timeliness of commercial landings reports by implementing online, multi-platform tools for real-time reporting for finfish and shellfish.

2.3 Provide the public with reports of finfish and shellfish harvest results.

2.4 Conduct diamondback terrapin and horseshoe crab spawning surveys and share data to partner management agencies and the public.

2.5 Complete an annual survey of shellfish resources within Maryland's Coastal Bays, and update the Coastal Bays Hard Clam and Blue Crab Fisheries Management Plan.

2.6 Assess the overall health of aquatic species and habitats, including the effects of emerging contaminants and microplastics.

2.7 Promote and support responsible and profitable shellfish aquaculture with incentives to assist production, and education and training on best practices to growers and the public.

2.8 MCBP will work with partners to continue the oyster gardening community science program.

Goal 3. Monitor and manage aquatic and estuarine habitats

The Coastal Bays have over 300 miles of shoreline, with most of our communities existing right on or near the Bays and their tributaries. Shorelines are the transition area between our open water and upland habitat making it incredibly important to numerous species throughout various stages of their lifecycles. Many of our natural shorelines are made up of saltmarshes and bare sand beaches. Natural shorelines have been converted to bulkheads, riprap, and other hardened shorelines to protect infrastructure from sea level rise, flooding events, and storm surges. There is little to no habitat provided by hardened shorelines, which impacts species like terrapins, horseshoe crabs, and coastal waterbirds who rely on bare sand beaches and saltmarsh habitat. Additionally, hardened shorelines can inadvertently contribute to increased shoreline erosion as they deflect wave energy to nearby locations. Erosion can cause excess sediment which is detrimental to shellfish populations, SAV beds, and the health of aquatic habitats in our bays.

Converting hardened shorelines back to resilient, dynamic living shorelines, where appropriate, is an important mechanism to protect shorelines from climate change impacts and provide habitat for native species. Living shorelines replicate natural features that reduce erosion, provide habitat, and can adapt and change in the dynamic bay ecosystem. Furthermore, natural shorelines promote the facilitation of marsh and seagrass migration into upland areas as sea levels rise.

There are few migration corridors in the watershed that can naturally facilitate upland migration. Protecting these corridors is critical to managing these habitats, which is why landowners should be encouraged to protect migration corridors through conservation easements or by constructing their own living shorelines.

In addition to managing natural shoreline habitat, it is important to continue monitoring aquatic and estuarine habitats including streams, SAV beds, and water quality. These monitoring initiatives help guide management decisions and determine where resources should be allocated to have the best impact on improving aquatic habitats and resources or to evaluate management practices.

Action Items

3.1 Continue research and support for management, protection and restoration of seagrass beds and exploration of various methods of monitoring.

3.2 Protect horseshoe crab and other wildlife populations by preserving bay beaches and other bottom habitats.

3.3 Support efforts to monitor and assess Harmful Algae and Phytoplankton including special Brown Tide analysis.

3.4 Maintain and enhance bay water quality monitoring programs to assess nutrient loading, bacteria levels and living resource responses.

3.5 Continue to support sustained improvements in reef enhancement by sponsoring permits for the Ocean City Reef Foundation.

3.6 Monitor near shore plant and animal species and habitat.

3.7 Asses the historic presence and extent of marshes with the potential for marsh migration in response to sea level rise.

3.8 Continue to expand and update data and information via the Coastal Atlas to monitor coastal conditions and inform protective actions.

3.9 Monitor gains and losses and conduct assessments of wetlands in the watershed to prioritize creation, conservation and restoration activities.

3.10 Conduct monitoring and assessment to characterize the health of streams in the Coastal Bays Watershed.

3.11 Use stream characterization health data to identify and pursue potential aquatic habitat management, stream protection, and restoration projects.

Aerial image of E.A. Vaughn Wildlife Management Area showing how marshes in the Coastal Bays are degrading and drowning due to ditching and vegetation die-back. Photo by Roman Jesien.

Goal 4. Monitor and manage plants and wildlife in the watershed

The Coastal Bays is home to hundreds of species, including over 100 rare, endangered, and threatened species. Health of the watershed is evaluated through monitoring trends in various species including horseshoe crabs, colonial nesting birds, and fish species. Long-term data is especially useful to evaluate trends in estuarine species that have fluctuating populations. However, long term monitoring of terrestrial species has not kept pace with the aquatic species. For example, even though Maryland ranks second in herpetofaunal diversity, there is little known about the status of the 60 reptile and amphibian species in the Coastal Bays. Herps (amphibians and reptiles) are good indicators of the health of streams and terrestrial habitats as they're highly sensitive to pollution and environmental degradation.

In addition to needing to expand monitoring efforts to understand populations for many of our wildlife species, we must monitor and manage invasive species in our watershed more effectively. Invasive species are problematic because they usually outcompete native species for habitat and resources. Ensuring that we are being proactive to introduced species before they become invasive is critical to maintaining the diversity of our watershed and health of our environment.

MCBP and partners are constantly working to expand our current monitoring efforts to better understand the status of the species in our watershed. In addition to the annual surveys that monitor populations of horseshoe crabs, coastal waterbirds, and various threatened and endangered species inhabiting Assateague Island, MCBP has recently reincorporated the monitoring of herp species.

Collaborating with our partners and volunteers allows us to obtain annual survey data that helps us manage species and their environments more effectively. Each year we promote and encourage our community members to participate in various survey events like the Backyard Bird Count to gain important data on the bird species in our area. MCBP hosts various bioblitz events to maintain a running list of species found in our watershed and holds numerous programs to remove invasive species at our restoration sites.

Additionally, partners like Lower Shore Land Trust and Maryland Department of Agriculture provide significant resources to our community members about native plants, invasive plant management, and upcoming species of concern that have the potential to become invasive in our watershed. MCBP is in the process of updating our Homeowners Guide to the Coastal Bays. The guide will provide a wealth of information that will educate our community on how to create and maintain bay friendly homes and yards. This includes how to provide habitat to native species and manage invasives to reduce their spread.

Action Items

4.1 Monitor and reduce the presence of terrestrial and aquatic invasive species within the Coastal Bays watershed through accepted best management practices.

4.2 Use existing indicators, monitoring data and game harvest information to protect and restore plants and animals including rare, threatened and endangered species in the watershed.

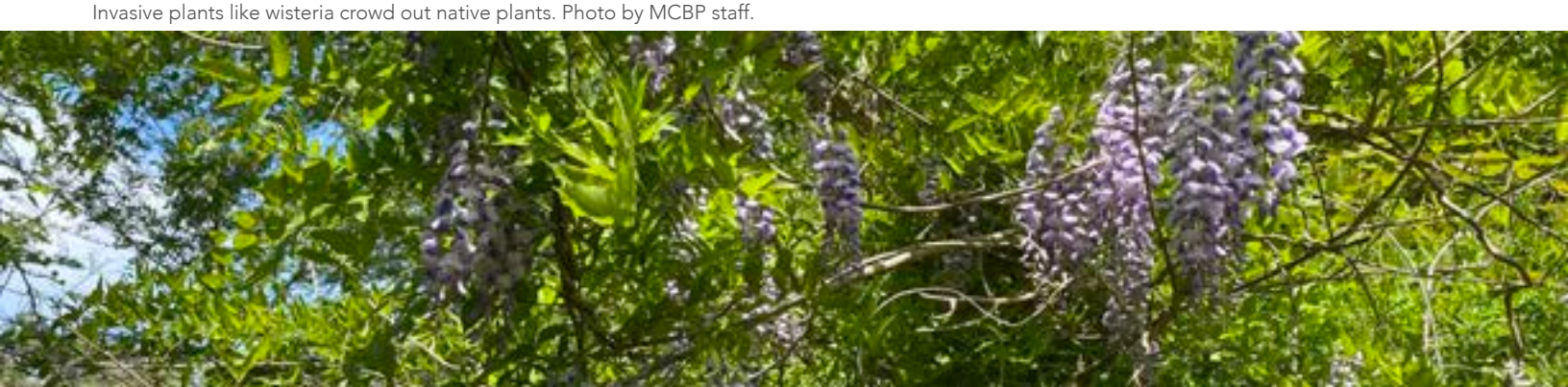
4.3 Monitor bird populations in the watershed to identify habitat and species enhancement needs and opportunities.

4.4 Encourage and require where appropriate, native vegetative plantings and conservation landscapes on public and private lands to enhance biodiversity.

"Maryland Coastal Bays Program recently awarded a grant to Lower Shore Land Trust for a Grasslands Habitat Restoration project. These habitats play a critical role in supporting biodiversity and maintaining ecological health. We greatly appreciate MCBP's recognition of this conservation challenge."

— Matt Heim, Executive Director, Lower Shore Land Trust

Invasive plants like wisteria crowd out native plants. Photo by MCBP staff.



Goal 5. Monitor and manage terrestrial habitats

The forests in the Coastal Bays watershed were historically composed of oak, maple, sweetgum, ash, cypress, and pine species. Conserving forests in our watershed is important as they provide valuable ecosystem services such as carbon sequestration, land stabilization, water filtration, and air purification. Today, only 50% of Worcester County is forested, and much of that forest consists mainly of pine species due to the conversion of native forests to pine monocultures for timber harvest.

Certain species, called forest interior dwelling species (FID), depend on large, contiguous forests that have an abundance of diverse tree species. Pine monocultures provide little habitat compared to forests with abundant species diversity, but it can take centuries for forests to return to historic compositions. In the Coastal Bays, forests are lost to development, agriculture, timber, and the production of other forest products. Large contiguous forests are becoming more obsolete causing impacts to FID populations.

Between 2013 and 2018, over 40% of total forest loss in Worcester County was due to forest transitioning into wetland, likely because of increased flooding and sea level rise. Sea level rise is causing saltwater intrusion to extend further inland threatening cypress swamps and other freshwater habitats. Increasingly salty soils and groundwater cause stress to forests, leading to stands of dead trees called "ghost forests." Saltwater intrusion is impacting agricultural land as well, causing some areas to no longer be productive.

Maintaining forest health is essential to the economy, community resilience, and maintaining biodiversity. Encouraging our local municipalities to plant trees and increase green spaces will provide several benefits to the community and environment. Specifically, trees provide shade and reduce temperatures, increase air quality, help mitigate flooding, and can reduce noise pollution. MCBP will continue to support efforts to monitor and assess forest cover in the Coastal Bays watershed and encourage partners to develop annual reports that summarize survey data. Through education and outreach programs, we can increase landowner awareness on best management practices, restoration techniques, and conservation easement programs. Additionally, identifying large areas of turfgrass and non-productive agricultural land and restoring it to natural habitat will improve ecosystem function. Finally, MCBP will support programs that protect existing old growth forests and support projects that restore Atlantic white cedar communities, which were lost due to overharvesting.

Action Items

5.1 Utilize Best Available Technology to assess forest health including composition, tree cover and including urban tree canopy.

5.2 Educate and provide support for private landowner afforestation and forest restoration opportunities including the preparation of Forest Stewardship Plans (FSPs).

5.3 Coordinate efforts to maintain forest health and extent for publicly owned lands.

5.4 Manage large extents of turfgrass areas in the watershed for improved habitat and ecosystem function reducing the need for chemical application.

5.5 Manage less productive agricultural lands for improved habitat and ecosystem function.

Above: Atlantic White Cedar Planting in Lizard Hill restoration site. Photo by MCBP staff.
Opposite, top to bottom: MCBP staff conducting forest composition assessment in potential restoration area. Photo by Roman Jesien. A restored non-tidal wetland on agricultural property in Isle of Wight watershed. Photo by Kim Alpblanalp. Native plant buffer adjacent to agricultural property. Photo by Beth Sheppard.

THEME 3

CREATE RESILIENT COMMUNITIES AND ECOSYSTEMS

Resilience is the ability to bend and not break. That may be the simplest way to describe it, but it is much more than that. Resiliency is not only the ability to bounce back from an adverse situation, but the ability to bounce back stronger, with more flexibility and wherewithal than previously.

When we look to the next ten years, we have a pretty good idea what we can expect. Higher temperatures. More intense precipitation. More frequent coastal storms. More high tide events. More flooding and longer droughts. And more people. With an annual population increase hovering around 1.5%, we need to be smart about what the future looks like—particularly in face of rising sea levels and increased storm impacts. These circumstances will not only affect our daily lives, but will strain our shared natural defenses like marshes, dunes, and shorelines, that we count on for mitigation.

Will we need to provide more irrigation for farms that may face more summertime droughts? Will we need to build bigger ditches to relieve storm effects? Will we need to raise the elevation of roads and other built infrastructure? Build bigger and stronger shoreline defenses?

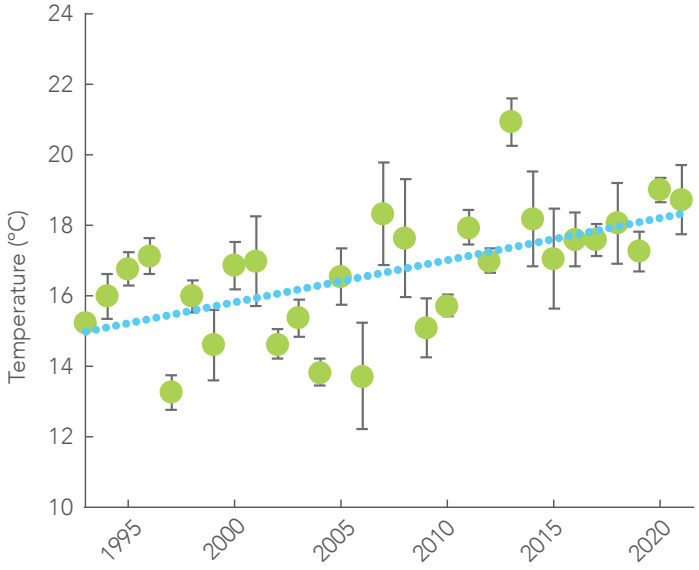


Figure 5. Data show significant interannual variation and increasing trend in surface water temperatures in the Coastal Bays in October from 1993–2021 (n=560, R2=0.59; 20 sites per month from the Delaware to Virginia state boundaries) (MD DNR Coastal Fisheries Trawl Survey).

With the input of the community and our county, state, and federal partners, the Comprehensive Conservation & Management Plan is an opportunity to plan for the future and develop a strategy that will help address these challenges. Strategies that include:

- Enhancing our natural defenses (marshes and wetlands, Coastal Bay islands, shorelines and riparian zones)
- Improving our stormwater systems to handle and process larger storm events, prevent flooding, and improve water quality
- Siting new development in areas that create the minimal impact on our resources
- Mapping areas suitable for marsh migration
- Educating the public about recent climate trends based on informed science
- Understanding the capacity for our marshes and forests to store carbon
- Increasing acres of protected forest lands
- Understanding the effects of climate change on our Coastal Bay ecosystems
- Implementing the actions described in our Climate Change Action Plan
- Moving toxic and hazardous waste facilities at risk

The Coastal Bays watershed is on the forefront of climate related impacts (Figure 5 and Figure 6). Understanding and adapting to this reality and planning for what we know is in front of us, is imperative. Implementing and carrying out the strategies and actions identified in this CCMP are critical to the long-term resiliency and viability of our resources and our communities.

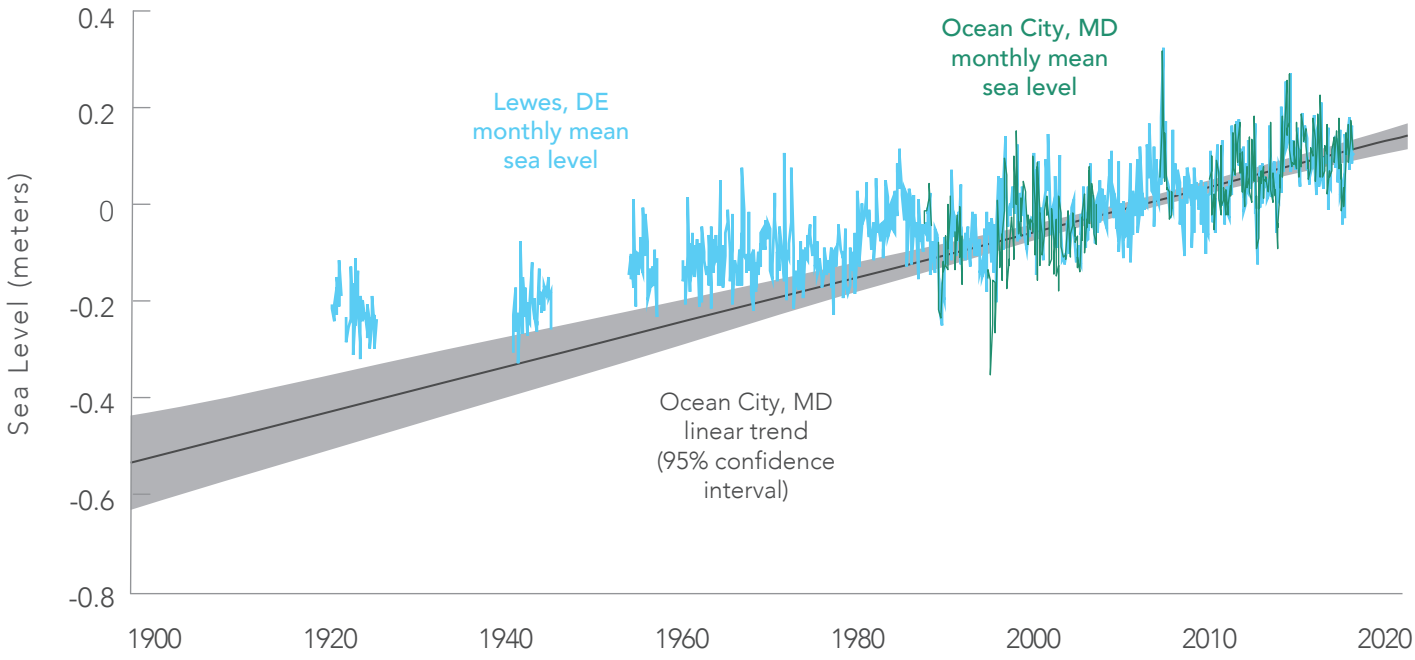


Figure 6. Mean sea level at the Ocean City inlet, MD and Lewes, DE. Sea level at Ocean City is rising at a rate of 5.6 mm (nearly a quarter-inch) per year, which is equivalent to a change of 1.84 feet in 100 years. Source: NOAA.

Increasing frequency of tidal flooding threatens both ecosystems and infrastructure. Photo by Jane Thomas, IAN Image Library.

Goal 1. Enhance resilience of ecosystems to natural disasters, sea level rise, and other climate change stressors

We are in the midst of a changing climate. The University of Maryland Center for Environmental Science anticipates a rise in sea level of 1 foot between 2000 and 2050. In addition to rising sea levels, other climate related changes are already occurring. Some of those include:

- The number of days where the maximum temperature is higher than 77 degrees is growing. In our region, there are 40 more summer days each year compared to 100 years ago.
- There are fewer days in the year when the low temperature is less than 0 degrees.
- We are receiving 2 to 7 more inches of precipitation per year than a century ago.
- Over the past 100 years, growing seasons have lengthened by 20–40 days.

In order to respond to these realities, we must enhance our resilience to sea level rise and other climate related stressors. But how do we do that? First and foremost, we need to reduce our emissions by reducing our dependence on fossil fuels and using alternative sources of energy that produce less emissions. Second, we should practice conservation and reduce, where possible, our dependence on energy—particularly those fuels which release CO_2. Finally, we need to prepare—for both the present and the future.

Our natural resources are vulnerable to these changes. Healthy shallow water habitat, marshes, shorelines, dunal systems, and streams with functioning riparian areas are our first line of defense for the destructive power of coastal storm surges, high intensity rainfall, waves, wind, and increasing temperatures.

With sea level rise we are already seeing a loss of tidal marsh due to more frequent inundation. Marsh grasses simply cannot tolerate too much water on the surface and marsh deterioration happens very quickly after the grasses die back. The additional loss of shoreline due to erosion exacerbates the problem as it lessens the amount of marsh available to buffer storms and wave energy. Strengthening our natural resources so that they are healthy and robust are paramount in this effort and identifying where this can be most effective are steps that must be taken to provide resilience and prepare for the future.

Action Items

1.1 Identify and prioritize ecosystem restoration opportunities in the watershed.

1.2 Restore marshes, shorelines, islands and upland ecosystems to natural conditions within the Coastal Bays watershed, including post restoration monitoring for adaptive management.

1.3 Work with emergency management agencies and other partners to develop recovery plans to support ecosystem conservation and resilience in the wake of natural disasters.

1.4 Research the effects of climate stressors on Coastal Bays ecosystem indicators.

1.5 Explore opportunities to improve permitting efficiency related to ecosystem restoration and resiliency projects.

The living shoreline project near the Assateague State Park boat ramp. Eroding shoreline was enhanced with headlands and beaches that dissipate wave energy and a freshwater wetland that intercepts storm water. Photo by Roman Jesien.

Goal 2. Enhance resilience of community assets and infrastructure to natural disasters, sea level rise, and other climate change stressors

Our landscape is defined by the Atlantic Coast and the many bays and waterways that shape our surroundings. Not only do these features shape our landscape, but they also shape our way of life. Much of Worcester County is situated in low-lying areas which are subject to flooding from inland rainstorms or susceptible to the effects of storm surges and storm-driven wave energy. Understanding what lies ahead and what we need to do to properly prepare is an essential task.

Much of our infrastructure, including roads, housing, businesses, and stormwater and sewer systems are located in areas that are vulnerable to climate-related concerns. Stormwater systems are easily overwhelmed with sudden and pronounced precipitation, particularly in areas with high amounts of impervious surfaces. Roads, buildings, and other structures vulnerable to storm surges and erosive forces may need to be elevated or moved to areas with less vulnerability.

The Maryland Coastal Bays Program has completed a Climate Vulnerability Assessment as well as a Climate Action Plan. These exercises helped to determine our most vulnerable actions from our 2015 CCMP and provide a framework for the adaptation of climate change related measures. Worcester County's Comprehensive Plan and the Worcester County Hazard Mitigation and Resilience Plan play a particularly important role in preparing for the future to address these issues.

Action Items

2.1 Partners will identify and prioritize climate adaptation strategies and actions to build resilience for protection of community assets including recreational amenities and infrastructure into local plans.

2.2 Encourage public and private marina owners to maintain and adapt existing marina facilities including piers, boat ramps, and kayak launch areas to enhance resilience to impacts of storm inundation and SLR.

2.3 Identify potential toxic risks from facilities that may be affected by climate change stressors, land subsidence and natural disasters as part of hazardous mitigation and resilience planning.

2.4 Consider adopting or modifying local standards to enhance resiliency for flood protection, and stormwater impacts including periodic review of locally based sea level rise projections.

2.5 Identify and document cultural and historic resources that may be impacted by climate stressors and natural disasters to inform resilience strategies.

Ocean City suffered severe flooding during Hurricane Sandy, which impacted Maryland on October 29–30, 2012. Photo by Ricky Kerrigan.

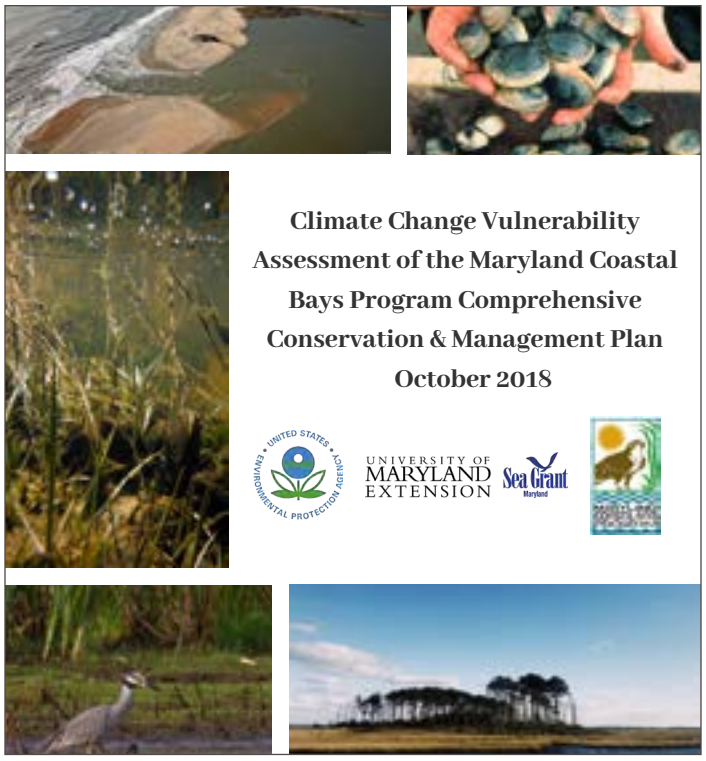
An old electrical transfer station was converted into a submerged gravel wetland to collect and treat stormwater in a Berlin neighborhood prone to flooding. Photo by Roman Jesien.

Goal 3. Implement the MCBP Climate Action Plan

The Maryland Coastal Bays Climate Action Plan was completed in 2024. This Plan was developed in response to a Climate Change Vulnerability Assessment (CCVA) which identified risks to the implementation of the CCMP posed by the impact of climate change stressors such as sea level rise and increased storminess. The Action Plan plays a key role in prioritizing future actions which will be a focus for the CCMP in the next 10 years. An annual analysis of how the recommendations of that plan are being incorporated into the Annual work plans for the Coastal Bays Program is essential to ensure focus for vital and strategic climate adaptation and resiliency actions.

Action Items

3.1 Ensure that the recommended adaptation actions within the Climate Change Action Plan (CCAP) are considered each year for implementation in MCBP and partner work plans.



The MCBP Climate Change Vulnerability Assessment was the first phase of the process for the program to become an EPA Climate Ready Estuary.

MCBP and Maryland DNR installed this living shoreline to protect the kayak launch area at Greys Creek Nature Park. Photo by Kevin Smith.

Goal 4. Coordinate with partners to develop and implement a Maryland Coastal Bays Sediment Management and Dredging Plan

Significant losses of our Coastal Bays islands, tidal marshes, and shorelines over the past 25 years are due to both human-induced actions and climate change related factors—particularly sea level rise. Over 50% of our identified bird nesting islands have been lost in the last 25 years. In the same time period, nearly 25% of our tidal marshes have been identified as severely degraded or lost due to historic mosquito ditching and sea level rise.

These habitats are of critical importance to a host of bird species that have used isolated islands and marshes to nest, raise young, and carry out their life-cycles in the marshes, shorelines, and open waters of the Coastal Bays. Of particular concern are the black rail, the salt-marsh sparrow, royal tern, common tern, and black skimmer—all listed as rare, threatened, or endangered in Maryland.

Beneficial use of dredged material is a key component to help restore and revitalize these habitats. However, navigational dredging is not happening at the rate necessary to provide these marshes and islands with the amount of material necessary to address the issue. Higher focus needs to be placed on opportunities for additional inlet dredging where material could be available to replenish the islands and marshes in Isle of Wight and Sinepuxent Bays.

Secondly, a serious investigation into the feasibility of dredging material outside of navigational channels is warranted. The Sediment Strategy for the Coastal Bays outlines the necessity to investigate the opportunities and, if applicable, pursue them to mine the necessary material to restore drowning marshes and eroding islands and further protect our shorelines.

Action Items

4.1 Implement recommendations from and update the USACE Ocean City Water Resources Study (OCWRS) of 1998.

4.2 Perform periodic renourishment per the Atlantic Coast Project authorization in order to maintain Ocean City beaches and dunes for storm damage reduction.

4.3 Continue the Assateague Island North End Restoration Project to restore the natural sediment supply to the barrier island.

4.4 Implement the MCBP Sediment Management Plan to utilize sediment for restoration projects and habitat enhancement in the Coastal Bays.

4.5 Establish and maintain a Dredging Advisory Group (DAG) to coordinate and implement the Sediment Management Plan.

4.6 Maintain navigational channel marking, mapping, and maintenance dredging to ensure public access to waterways in the Coastal Bays.

This photo shows Tern Island in Isle of Wight Bay in the foreground, one of four islands constructed in the Coastal Bays in 2013/14 to provide new habitat for colonial nesting birds. All four islands have since disappeared due to erosion and sea level rise. Photo by Kathy Phillips.

Goal 5. Monitor and conduct research to assess conditions and identify trends and challenges to guide resilience programs and policies.

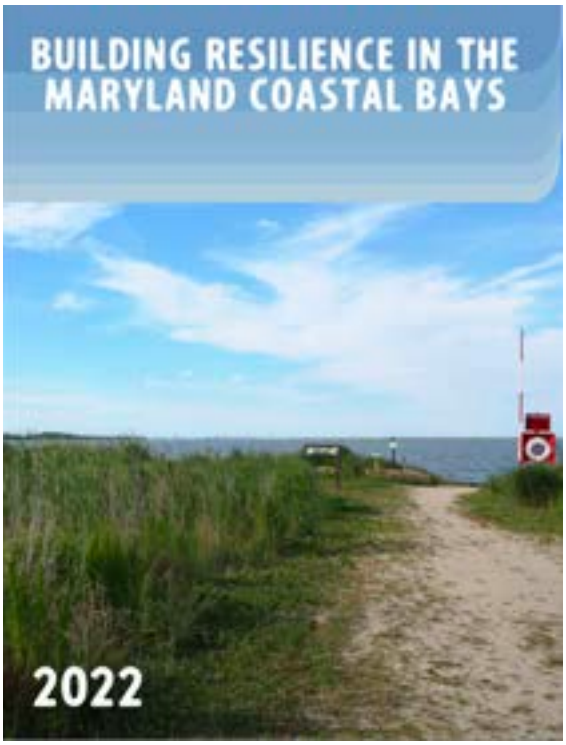
The Maryland Coastal Bays Program has been fortunate that we have been able to partner with highly respected and well-regarded science institutions over the years. Good, rigorous science is the backbone of our organization and conducting well-conceived monitoring has provided a solid baseline of water quality information over the years. Conducting similar monitoring to understand our climate related changes is imperative to understanding how our environment is responding to these changes. Water temperature trends, inundation and storm surge modeling, rainfall and stream flow measurements, all help us understand how climate change is affecting our surroundings and what remedies may be most effective.

Action Items

5.1 Monitor chemical, ecological, and spatial trends to assess the impacts of sea level rise and other climate change stressors to inform a long-term science agenda.

5.2 Conduct an assessment for research and monitoring needs and recommend priority assignments and schedule.

5.3 Partners will collect, manage, and share GIS data that are publicly available for the watershed.



The 2022 State of the Bays Report.

Former Chairman of the MCBP Science and Technical Advisory Committee Dr. Bill Dennison presiding over the release event for the 2022 Coastal Bays Report Card and State of the Bays Report.

"Monitoring and research provide the critical scientific foundation for all that MCBP and its partners do to protect and restore ecosystems in the Coastal Bays watershed. Applying these tools to the challenges associated with our changing climate will be a vital component of our work over the next decade and beyond."

— Bill Dennison, Former Chairman of the MCBP Science and Technical Advisory Committee

Goal 6. Promote and facilitate conservation of land, natural resources, energy, and manufactured materials.

Reducing our dependence on fossil fuels and maintaining a healthy environment is one of our most effective avenues to mitigate the effects of climate change. Forests, wetlands, and meadows that capture carbon, reduce runoff, and process nutrients are critical to this effort. Maintaining and increasing our natural lands is a proven strategy to help in that effort. Not only do they provide habitat value and improve water quality, but they also provide resilience for excessive precipitation events and help protect against storm damage.

Every opportunity to enhance and restore degraded landscapes and habitats should be pursued. Particularly in those areas where excessive stormwater runoff from urban and agricultural lands is an issue and where housing and infrastructure are threatened by storm driven wave energy and storm surges.

Strategically placed easements to provide for marsh migration, ensure the maintenance of healthy forest lands, and prevent the development of vulnerable areas should be prioritized. Worcester County is actively working to preserve farmland in the northern Coastal Bays by using easement funds from the State's Rural Legacy Program. The County's Comprehensive Plan should work to protect more acres for preservation, particularly those areas that may provide additional resilience for climate driven weather events.

Reducing the use of plastics as well as active and robust recycling and composting programs reduce our consumption of energy and help maintain a healthier environment for future generations. Opportunities to use regenerative solutions to retrofit properties and improve stormwater facilities are available and cost-effective. These practices strengthen our communities, reduce our reliance on antiquated and outdated practices, and improve our overall resilience.

Action Items

6.1 Support efforts to retain farming and forestry as viable land uses in the watershed.

6.2 Promote and support land conservation in the watershed to protect and enhance farms, forests and habitat.

6.3 Encourage and support waste reduction, recycling and re-use policies, and programs for commercial, institutional, governmental and residential generators.

6.4 Encourage the preservation and creation of ecologically beneficial site features for new and existing public and private land development.

6.5 Protect cultural, historical, and natural resource areas.

6.6 Support the development and implementation of energy conservation practices and clean energy programs while recognizing concerns for impacts of specific projects.

6.7 Support development of low-impact transportation and recreation modalities including walkable, bikeable and water use trails throughout watershed.

Benches can be made of recycled plastics from cigarette butts. Photo by Sandi Smith.

THEME 4

DEVELOP PUBLIC ENGAGEMENT AND PARTNERSHIPS

Our Coastal Bays communities weave together a variety of people, occupations, backgrounds, perspectives, and values. The Maryland Coastal Bays Program serves as a resource for our communities by increasing environmental literacy for all people living in and visiting our watershed through information sharing and experiential learning. Public involvement is essential to the mission of the organization. We engage youth, adults, educators, decision makers, business owners, and visitors. By leveraging these diverse perspectives and facilitating partnerships, MCBP can amplify the voices within our community and ensure a healthy watershed for all.

This vital theme of "Develop Public Engagement and Partnerships" is supported by seven goals. Each goal contains specific actions that will be implemented through our annual work plans over the next ten years. A new goal that has moved to the forefront of our efforts is to "Integrate Diversity, Equity, Inclusion, Justice, and Accessibility (DEIJA) into MCBP organizational and programmatic policies and actions." While factions of our community have not had a seat at the table and were not heard in the past, moving forward we strive to listen to their voices and amplify them. We will develop partnerships with key DEIJA stakeholders to uplift community-led initiatives. We will also provide access to education and outreach programs, restoration sites, and financial resources to engage diverse populations within our watershed.

We develop lifelong stewards of the Coastal Bays through "Promote environmental literacy for the public through education, outreach, communication and engagement activities" and "Coordinate with MCBP partners to develop and deliver academic programming." Outdoor experiential learning remains at the heart of our programming. By engaging with our audiences out in our watershed, the content becomes tangible, related, and reflective within their own lives. Over the nearly three decades of MCBP programming, we have learned that environmental literacy can take many forms. We shape our programs to serve each group's specific needs, abilities, and interests to spark and nurture connections to our watershed. Interpretive programs, learning resources, social media communications, and other outreach activities further education and engagement in the Coastal Bays.

Through a collaborative partnership, we created a Coastal Bays Watershed Map to provide visual representation of our watershed, its attributes, and the ecosystems and communities found within it. This first-of-its-kind map can be found hanging in dozens of classrooms around Worcester County, gracing the walls of welcome centers, governmental offices, and neighboring non-profits, and even framed in our residents' homes. Over the next ten years, we will continue to "Develop and support partnerships that advance mutual interests and are aligned with CCMP goals" to foster a meaningful network of Coastal Bays supporters.

50% of the profits from Assateague Outfitters support the Maryland Coastal Bays Program. Photo by Assateague Outfitters.

MCBP is truly fortunate to have a robust volunteer base that devotes their time and energy toward our initiatives that protect, restore, and educate. The continued support of our community enables us to "Cultivate volunteer participation in all aspects of community science, education and outreach activities." Providing a multitude of participation options allows for volunteers of different backgrounds and abilities to give back to the Coastal Bays. Volunteerism empowers citizens, influences governmental decisions, and assists in providing pathways to finding solutions to issues around our watershed.

Through an initial collaboration with regional nonprofits and state funding, we created an oyster gardening program where private homeowners deploy oyster cages off their docks to grow spat into vibrant mini-oyster reefs that filter out sediment and improve water quality and clarity. Once the oysters are fully grown, they are relocated to reefs and restoration sites throughout the Coastal Bays to continue prospering and providing ecosystem services. This community science program has continued to grow and evolve due to the partnership with empowered volunteers and the community group, Protectors of the St. Martin River (the Protectors). Since 2018, the Protectors have taken on management aspects of the project and developed a more effective oyster cage design, which MCBP has adopted.

MCBP is guided by four committees which unite various stakeholders to solicit ideas, initiatives, and concerns through the Coastal Bays Management Conference. Together these consensus-driven committees "Support the NEP program effort through the MCBP program administration and Management Conference." Public involvement ensures the development and implementation of the goals and actions outlined in the Comprehensive Conservation & Management Plan. In 2023 the Citizens Advisory Committee was revitalized with a goal to "Conduct outreach efforts to the public and policymakers to gain support and promote the Maryland Coastal Bays Program." This committee supports MCBP programs and initiatives through the participation of its diverse constituents, ensuring that public involvement and community education are a central component of the program.

We all have an impact on our watershed, and thus have a responsibility of stewardship to the Coastal Bays. The seven goals in this theme, "Develop Public Engagement and Partnerships", detail current actions and future opportunities that will work to unite our community and incorporate their thoughts and values as we address the ever-changing nature of our watershed over the next 10 years.

Public educational seining event at Sunset Island in Ocean City.

Goal 1. Support the NEP program effort through the MCBP program administration and Management Conference

Implementation of the CCMP is a consensus-driven effort managed by the MCBP program staff and guided by partners and stakeholders organized into a Management Conference comprised of the MCBP Board of Directors and four advisory committees.

Underlying the broad Themes, Goals, and Actions outlined in the CCMP, more detailed management and programmatic implementation activities are guided by a series of Plans including a Habitat Plan; Monitoring Plan; Communication, Education, and Outreach Plan; and a Finance Strategy. A Climate Action Plan is also integrated into the actions of the workplans and the CCMP.

The Management Conference Committees meet regularly throughout the year to assist staff in prioritizing CCMP Actions and related Plans in the development of annual administration and project implementation workplans that guide the day-to-day activities of MCBP and partner entities.

Action Items

1.1 Implement and periodically revise a Communication, Education and Outreach Plan of the CCMP to ensure community involvement.

1.2 Implement and periodically revise a Finance Strategy that will establish long-term financial sustainability to implement the CCMP through diverse resources and partners.

1.3 Develop, implement, and periodically revise a Science and Research Plan to inform scientific decision making relating to the CCMP.

1.4 Develop workplans for approval and funding from EPA and other grantors to implement actions in the CCMP.

1.5 Engage the partners and watershed community through regularly scheduled meetings of the Management Conference committees.

Community meeting to reveal 2023 Coastal Bays Report Card featuring the highest grade of B- for the health of the Bays since the founding of the program. Photo by Brooke Eckert.

Goal 2. Promote environmental literacy for the public through education, outreach, communication, and engagement activities

The Maryland Coastal Bays Program promotes environmental literacy within the community by providing the public with resources and skills to make informed, responsible decisions that will have a positive impact on the environment through a mix of outreach, education, and communication efforts. Providing space for personal experiences, direct connections with nature, and cultivating a sense of place can help create lifelong stewards of our environment.

Outreach events provide the public access to learn from and engage with MCBP staff and partner organizations about current issues facing the Coastal Bays. "Bay Day" is one of the largest collaborative events hosted annually with Ocean Pines Association. This environmental festival educates residents on actions that they can take to create more bay-friendly environments in their own backyard. Each year, over 35 environmental organizations participate with their focus ranging from forests, farms and birding to oysters, bay creatures, and ocean conservation. Attendees of all ages experience interactive and informational exhibits, educational boat tours on the St. Martin River and hands-on nature-based activities.

Environmental Education provides opportunities for citizens to foster a deeper connection to the natural world. MCBP strives to provide a variety of direct education opportunities for youth and adults through presentations, workshops, and experiences in the field. During the summer months, MCBP runs three one-week sessions of Estuary Explorers camp through the Ocean City Recreation and Parks Department. This camp is designed to immerse youth in nature through outdoor investigations, field trips, and hands-on exploration. For adults, the Explore the Estuary learning series offers a unique opportunity for community members to broaden their knowledge of the Maryland Coastal Bays watershed. Four programs are offered yearly and provide an in-depth look into both the natural world and conservation issues. Each program in the series features an expert who contributes professional knowledge to the program focus.

In-person events such as education programs and outreach events are only one component of the strategy to engage the public and promote environmental literacy. Science communication is another crucial way to connect an even broader audience to the issues and conservation efforts occurring in the Coastal Bays watershed. Through a mix of digital and print media, MCBP provides educational information, promotes events, and translates findings into learning resources. Each year, a report card is produced to enhance public awareness on the health of the bays and highlight important initiatives occurring. Over the next 10 years, MCBP will continue to grow our digital presence and produce materials to engage the public.

Guided boat tours of the Bays introduced in 2022 provide opportunities to engage the community in educational experiences. Photo by MCBP staff.

Action Items

2.1 Collaborate with watershed residents and community organizations to discuss climate resiliency planning and implement responsive actions.

2.2 Deliver direct educational opportunities such as workshops, events, and programs to explore the watershed, increase knowledge, and cultivate a sense of place for individuals and community groups.

2.3 Develop and translate findings into learning resources (e.g., Homeowner's Guide, Report Card) to promote research, restoration, and general watershed health including stormwater management.

2.4 Provide information and promote events through digital communication including social media platforms, press releases, and newsletters.

2.5 Communicate to local businesses, watershed partners and residents the beneficial relationship of ecosystem health to economic development, tourism, recreation and quality of life.

2.6 Collaborate on education, outreach and engagement programs related to marine issues including responsible use by local stakeholders, marine debris and trash-free waters.

2.7 Facilitate stakeholder meetings to share information, collect feedback, and educate anglers on the purpose of fisheries management policies.

2.8 Provide outreach for integrated pest management including habitat for birds, bats, and natural predators.

2.9 Educate the public about "best practices" for water conservation, well safety, and septic system management.

2.10 Inform the public about farm conservation practices and support local farms, food and fiber.

2.11 Provide education and outreach to small acreage landowners and those with backyard habitat and forests through the Master Gardener, Watershed Protection and Restoration, and Maryland Woodland and Watershed Stewards programs.

2.12 Promote responsibly sourced local seafood and shellfish to inform consumers and support commercial fisheries.

2.13 Sponsor Beach District Planting and Bayscape Planting programs to provide water quality and habitat benefits.

2.14 Coordinate local educational and volunteer efforts to assist with stranded and injured animals throughout the watershed.

2.15 Enhance public awareness and information resources for public recreational facilities, and increase opportunities to access land and water based activities.

2.16 Conduct public outreach regarding hazardous materials spill and disposal contact information.

2.17 Encourage community members and businesses to implement bay friendly lawn care practices to reduce chemical run-off from residential and developed areas through education and outreach.

The annual Bay Day event in Ocean Pines has attracted more than 1,000 residents and visitors to engage with environmental exhibitors and family fun. Photo by MCBP staff.

Goal 3. Coordinate with MCBP partners to develop and deliver academic programming

MCBP works to develop place-based, interdisciplinary educational programs for watershed youth, educators, and higher education communities. The goal is to deliver programs that do more than provide knowledge about the watershed environment and restoration work, but also allow audiences to develop an understanding on how to address local issues. Outdoor experiential learning remains a priority at MCBP, featuring work to create intentional experiences that provide knowledge, connect to lived experiences, and open opportunities for personal growth.

MCBP develops and delivers field excursions, in-the-field service trips, classroom presentations, and after-school programs to public school, private school, and homeschooled youth throughout Worcester County. MCBP also works collaboratively with higher education institutions on Maryland's Eastern Shore, such as Salisbury University and University of Maryland Eastern Shore, to provide internships, graduate research opportunities, and career development. MCBP offers various activities such as fish sampling, water quality monitoring, forest surveying, invasive removal, wetland plantings, sensory explorations, and nature journaling. These programs are customized based on student and subject need, and all lessons align with Next Generation Science Standards.

Over the past decade, MCBP and Worcester County Public Schools (WCPS) have worked to deepen their partnership to best serve local K-12 public school students. This partnership has been essential in reaching not just students, but their families. Collaboratively, MCBP and WCPS have designed new curriculum, developed grant programs and Meaningful Watershed Educational Experiences, facilitated professional development opportunities for area formal and informal educators, and delivered after-school programs targeted at WCPS system Title One schools.

In 2024, in collaboration with WCPS, MCBP hired the first ever Environmental Literacy Specialist who works to finalize and implement an integrative Environmental Literacy Plan across Worcester County. The specialist works to design and execute cross-curricular activities, run environmental afterschool programs at Title One elementary schools, and support environmental education initiatives and outreach within both WCPS and MCBP.

Coastal Bays works to personally connect with teachers, educators, and community leaders by providing opportunities to become more fluent in Coastal Bays ecology and issues, and to learn how to create transformative student-centered outdoor experiences. Through the years, professional development programs have been specifically molded to best suit local educators' needs based on yearly feedback. They are focused on connections to local resources, exposure to innovative conservation techniques and scientific inquiry, and building on a sense of place in the watershed that the teachers can use in their classrooms.

MCBP is actively engaged in the North American Association for Environmental Education, the Mid-Atlantic Marine Educators Association, the National Association of Interpretation, and the Maryland Association for Environmental and Outdoor Education (MAEOE). MAEOE is one of MCBPs closest education partners and providers and supports our goals of providing high quality environmental education to our community.

Area teachers practice seining during a professional development workshop. Photo by MCBP staff.

Action Items

3.1 Support the WC public and private schools and homeschool groups with resources and curricula development for environmental literacy, and the facilitation of meaningful outdoor experiences for K-12 students.

3.2 Provide programming and other education opportunities to higher education undergraduates and graduates, with a specific target of the Lower Shore area and higher education institutions such as UMES, SU, and Wor-Wic Community College.

3.3 Provide and facilitate professional development opportunities for both K-12 formal and informal educators with an emphasis on the Coastal Bays watershed.

3.4 Support the Maryland Association of Environmental and Outdoor Education (MAEOE) and other specialized education organizations.

"Maryland Coastal Bays has been a vital partner in advancing environmental education across Worcester County Public Schools. Their commitment to fostering environmental literacy continues to open new doors for students, inspiring deeper connections to the watershed and future stewardship."

— Jennifer Sills, Coordinator of Instruction: K-12 Science, Environmental Literacy, and School Library, Worcester County Public Schools

Students at the Assateague Education Program. Photo by MCBP staff.

Goal 4. Cultivate volunteer participation in all aspects of community science, education, and outreach activities

Community involvement in the protection and restoration of the Coastal Bays watershed through volunteer programs empowers citizens, increases knowledge of the watershed, and helps produce stewards of our local environment. Engaging our community can increase the support for our bays as well as policies and practices that impact our natural resources. Volunteers provide the necessary power to maintain, monitor, and manage the physical, chemical, and biological processes around the watershed.

Many opportunities are available for volunteers from different backgrounds and abilities to participate in a wide variety of programs. MCBP conducts community science efforts such as water quality monitoring and oyster gardening, which allow the participants to observe and collect data on their own, but with supervision and training. These programs retain volunteers for years since they are connected to their own interests and values. Other forms of community science include seasonal projects such as horseshoe crab and diamondback terrapin monitoring, which open the door to participation for both visitors and residents. These efforts not only create environmentally active community members, but also provide important data to evaluate the health of the waters of the Coastal Bays.

Scheduled volunteer programs offer staff-led opportunities on public and private watershed restorations sites. The "Discover Your Watershed" volunteer event series that runs yearly during the spring and fall months brings community volunteers of all ages to MCBP-managed restoration sites to develop firsthand knowledge of the properties and assist with trail development and maintenance, invasive species removal, property clean ups, habitat restoration, and biological monitoring.

Environmental education throughout the watershed can be leveraged and supported with using trained, informed volunteers. These volunteers become the face of the

Community volunteers help plant beach grasses at Selsey Road shoreline restoration and resilience site. Photo by Coastal Bays staff.

Discover Your Watershed event at Ilia Fehrer Nature Preserve. Photo by MCBP staff.

organization and advocate for the health of the watershed. Activities conducted by volunteers have included working exhibit tables, leading bay boat tours, and teaching interpretive programming. These activities allow for increased outreach and education program opportunities, resulting in heightened awareness of the Coastal Bays strengths and challenges.

MCBP works to acknowledge our dedicated volunteers and their contributions. Each year, MCBP holds a volunteer celebration to recognize their dedication and hard work. Another level of recognition is through the annual Coastal Bays Report Card publication and announcement event. At the event, MCBP awards "Gold Stars" to individuals and organizations demonstrating exemplary commitment to volunteerism benefiting the Coastal Bays Program and the health of the watershed.

Action Items

4.1 Provide annual volunteer opportunities to individuals and community service organizations via events, festivals, property management and land stewardship.

4.2 Provide training for community scientists to monitor and survey natural resources, fish, and wildlife populations.

4.3 Recognize the contributions at many levels, of citizens, volunteers and organizations devoted to conservation in the Coastal Bays watershed.

4.4 Continue Horseshoe Crab and Terrapin counts and promote the use of cull rings and Turtle Exclusion Devices on all recreational pots.

Goal 5. Develop and support partnerships that advance mutual interests and are aligned with CCMP goals

One of the most impactful opportunities as a National Estuary Program is the ability to foster strong partnerships among stakeholders and create space for collaboration. Maryland Coastal Bays Program is proud to bring together diverse perspectives to pursue and achieve mutual goals leading to the improved health of the watershed.

MCBP partnerships are fostered in many forms to promote conservation and restoration policies and activities, provide public access and recreational opportunities, and preserve and celebrate the history and culture of the watershed and its communities. MCBP serves as both participants and leaders of local and regional teams that work towards specific conservation and restoration goals.

MCBP is partnering with the Ocean City Lifesaving Station Museum to create an exhibit along the Ocean City boardwalk displaying a mural painted by a local artist that depicts the Coastal Bays estuarine ecosystem. MCBP is also a leading member of a partnership group working to bring to fruition a landscape-scale restoration plan for Maryland's salt marshes called "Marshes For Tomorrow."

MCBP supports partners and local community organizations through financial grants, along with scholarships for students pursuing post secondary environmental degrees or employment training opportunities. The Program also has a robust internship and workforce development program, which equips high school, college, and post-graduate students with firsthand experience in the environmental field with a focus on environmental science and education.

MCBP is placing a renewed focus on incorporating diversity, equity, inclusion, justice, and accessibility into our partnership goals and activities. We are seeking diverse collaborations that prioritize community-led initiatives to best serve and support local environmental needs.

Carly Toulan joined MCBP as an intern and was then hired as a full-time environmental scientist. Photo by MCBP staff.

Action Items

5.1 Provide scholarships, internships and other workforce development opportunities for high school and college students and graduates in the Coastal Bays watershed.

5.2 Implement Supplemental Environmental Projects (SEP's) resulting from a violation settlement, preferably in the same subwatershed.

5.3 Respond and refer community concerns related to possible violations of environmental protections to the appropriate agency.

5.4 Participate in local and regional teams and networks to communicate and collaborate on conservation and restoration activities in the watershed.

5.5 Participate in and share information at conferences, meetings, workshops, and technology transfer opportunities to receive and provide professional development.

5.6 Seek partnerships that support activities generating revenue for MCBP and others, while advancing programmatic and organizational community interests.

5.7 Support agencies and organizations working toward mutual CCMP goals through financial partnerships including mini-grants, research grants, subawards and sponsoring memberships

5.8 Provide expertise and a voice for the watershed by participating on boards, advisory councils, planning committees and attending relevant meetings.

5.9 Support organizations and programs working towards the preservation of the history and culture of the watershed and its communities.

5.10 Collaborate with partners and stakeholders to develop plans, projects, and maintenance guidelines that provide access and recreational opportunities on publicly owned lands.

Goal 6. Conduct outreach efforts to the public and policymakers to gain support and promote the MCBP

The key component of the National Estuary Program is its focus on consensus-based collaboration, meaning MCBP works with the public, policymakers, and partners to create and implement goals in this management plan to conserve and protect the Coastal Bays ecosystem and the communities that depend on it.

The goal of outreach efforts start with this actual management plan. Every ten years, MCBP reaches out to the community, partners, and policy makers to make sure this program develops a management plan that reflects and advances the needs and interests of the people, ecosystems, and wildlife that inhabit the watershed.

Outreach to develop consensus and promote collaboration continues into the Plan's implementation phase, including engaging with elected officials to enact supportive policies, engaging the public to cultivate increased understanding of watershed challenges and opportunities, and engaging with public and private funding sources to generate financial resources critical to project development, execution, and evaluation. This ongoing outreach takes on many forms, from traditional and social media, to direct meetings, to participation on boards, committees, and community issue forums.

Action Items

6.1 Inform federal, state and local agencies along with NGO's about the purpose and benefits of the National Estuary Program and establish dialogue among them.

6.2 Identify resource management issues and engage elected and appointed officials as to the challenges, possible solutions and funding needs.

6.3 Attend and participate in outreach events and meetings in the community to spread knowledge of watershed stewardship and best management practices.

6.4 Develop, implement and respond to opportunities to develop funding through public and private grants, to supplement core EPA funding in support of CCMP programs and activities.

State Senator Mary Beth Carozza presides over 2024 event showcasing new Maryland license plate commemorating Chesapeake and Coastal Bays. Photo by MCBP staff.

EPA Headquarters and Region 3 staff join MCBP staff in unveiling of Ocean Boardwalk exhibit depicting Coastal Bays marsh ecosystem. Photo by MCBP staff.

Goal 7. Integrate Diversity, Equity, Inclusion, Justice, and Accessibility (DEIJA) into MCBP organizational and programmatic policies and actions

Maryland Coastal Bays Program strives to incorporate Diversity, Equity, Inclusion, Justice, and Accessibility (DEIJA) values throughout all of our organization's goals, programs, activities, financial policies, and personnel decisions. The Program prioritizes community-driven initiatives and focuses on creating trustworthy relationships with diverse communities in the watershed.

In 2022, MCBP received a grant from the Community Foundation of the Eastern Shore and was matched with a Diversity and Inclusion consultant. For a full year, MCBP worked alongside the consultant to design and develop a Diversity and Inclusion Strategic Plan to take a deeper look at DEIJA at MCBP and infuse more DEIJA initiatives in our policies and programs.

As part of the Program's application for federal Bipartisan Infrastructure Law (BIL) funding, MCBP created an Equity Strategy in 2023 that aligns with the EPA's equity standards to further establish programs and practices as consistent with local, state, and federal DEIJA efforts. This Equity Strategy is being implemented at MCBP throughout our programmatic efforts, including identifying and supporting the needs and interests of diverse, disadvantaged, overburdened, and underserved communities in the watershed.

In 2024, MCBP formed an internal DEIJA Committee to ensure our program continues to promote and embody DEIJA values and integrate them into every aspect of our work. This committee seeks expert guidance from outside MCBP by contracting DEIJA consultants and inviting speakers from local organizations to share "lessons learned" from successfully working with disenfranchised communities to implement environmental restoration projects.

In the ten years ahead, MCBP will strive to develop and strengthen partnerships with disadvantaged communities, seek diverse collaborations that prioritize community-led initiatives, reflect DEIJA values in internal hiring decisions and scholarship and mini-grant awards, and improve the accessibility of MCBP and partner information, services and resources to all audiences.

Action Items

7.1 Integrate DEIJA values into all internal organizational matters, including management, personnel, financial policies and activities.

7.2 Implement the MCBP Equity Strategy through all appropriate programmatic efforts, including identifying and supporting the needs and interests of diverse, disadvantaged, overburdened, and underserved communities.

7.3 Improve the accessibility of MCBP and partner information, services and resources to all audiences, including those with physical and mental disabilities.

Worcester County Public Schools student participants at a 2023 Worcester Environmental Training, Leadership, and Stewardship (WETLANDS) Retreat.

CCMP Crosswalk Table

Provided below is a chart identifying the major structural changes between the 2015 CCMP and 2025 revision. The 2015 Plans in the CCMP were replaced with action-oriented Themes. The new Themes "Create Resilient Communities and Ecosystems" and "Develop Public Engagement and Partnerships" more accurately reflect the EPA guidance and MCBP program priorities. Notes on major changes are provided.

2015 CCMP		2025 CCMP	
4 Action Plans		**4 Themes**	
Water Quality		Provide Healthy Waters	
Fish and Wildlife		Protect Fish, Wildlife and their Habitat	
Recreation and Navigation		Create Resilient Communities and Ecosystems	
Community and Economic Development		Develop Public Engagement and Partnerships	
2015: 14 Goals and 34 Challenges		**2025: 21 Goals**	
Challenges were viewed as between a Goal and Action		Some 2015 Challenges became Goals, others Actions	
222 Actions		**124 Actions** (Many of the 2015 Actions have been combined)	
Water Quality Goals		**Provide Healthy Waters Goals**	
WQG1	Decrease nutrient loading throughout the watershed.	PHWG1	Reduce nutrient and pollutant loading in the watershed.
WQG2	Decrease inputs of toxic contaminants. (Toxic Contaminants are covered in PHW1 Pollutants.)	PHWG2	Protect and conserve groundwater.
WQG3	Implement a strategy to meet Total Maximum Daily Loads.	PHWG3	Develop and implement comprehensive watershed programs and strategies to achieve TMDL Standards.
Fish and Wildlife Goals		**Protect Fish, Wildlife and Their Habitat**	
FWG1	Characterize, monitor, and manage fishery resources and habitats.	PFWHG1	Update and implement a comprehensive Monitoring Plan and Habitat Protection/Restoration Strategy as separate components of the CCMP.
FWG2	Characterize, monitor, and manage estuarine resources and habitats.	PFWHG2	Monitor and manage finfish, shellfish and other aquatic species.
FWG3	Characterize, monitor, and manage terrestrial resources and habitats.	PFWHG3	Monitor and manage aquatic and estuarine habitats.
FWG4	Expand upon the coordinated effort to collect and report on Coastal Bays geomorphic and biometric information. (FWG4 is represented in Theme 3 and 4.)	PFWHG4	Monitor and manage plants and wildlife in the watershed.
		PFWHG5	Monitor and manage terrestrial habitats.

2015 CCMP		2025 CCMP	
Recreation and Navigation		**Create Resilient Communities and Ecosystems**	
RNG1	Improve recreational opportunities and access to the coastal bays and tributaries (RNG1 and RNG2 now in DPEPG2.)	CRCEG1	Enhance resilience of Coastal Bays ecosystems to natural disasters, sea level rise, and other climate change stressors.
RNG2	Balance resource protection with recreational use (RNG1 and RNG2 now in DPEPG2.)	CRCEG2	Enhance resilience of community assets and infrastructure to natural disasters, sea level rise, and other climate change stressors.
RNG3	Continue to implement the Ocean City Water Resources Study recommendations (RNG3 and RNG4 now in CRCEG4.)	CRCEG3	Implement the MCBP Climate Action Plan.
RNG4	Manage sediment alterations in a manner beneficial to the local economy and natural resources (RNG3 and RNG4 now in CRCEG4.)	CRCEG4	Coordinate with partners to develop and implement a Maryland Coastal Bays Sediment Management Plan (SMP).
		CRCEG5	Monitor and conduct research to assess conditions and identify trends and challenges to guide resilience programs and policies.
		CRCEG6	Promote and facilitate conservation of land, natural resources, energy and manufactured materials.
Community and Economic Development		**Develop Public Engagement and Partnerships**	
CEG1	Manage the watershed to maximize economic benefits while minimizing negative resource impacts. (CEG1 now represented as a part of DPEPG2.)	DPEPG1	Support the NEP program effort through the MCBP program administration and Management Conference.
CEG2	Enhance the level of sustainability in land use decision making. (CEG2 now represented as a part of CRCEG6.)	DPEPG2	Promote environmental literacy for the public through education, outreach, communication and engagement activities.
CEG3	Educate and inform the population so it can make knowledgeable decisions for the community and its future. (CEG3 now represented as a part of a broader DPEPG2.)	DPEPG3	Coordinate with MCBP partners to develop and deliver academic programming.
		DPEPG4	Cultivate volunteer participation in all aspects of community science, education, and outreach activities.
		DPEPG5	Develop and support partnerships that advance mutual interests and are aligned with CCMP goals.
		DPEPG6	Conduct outreach efforts to policymakers to gain support and promote the Maryland Coastal Bays Program.
		DPEPG7	Integrate Diversity, Equity, Inclusion, Justice, and Accessibility (DEIJA) into MCBP organizational and programmatic policies and actions.

Understanding the 2025 CCMP Themes, Goals, and Actions Table

As presented in the narrative body of the CCMP, and within the guidance provided by EPA, CCMP Themes and Goals are accomplished by identifying specific Actions to be implemented by the MCBP partners to address watershed conservation, protection, and restoration issues.

Action alone does not achieve environmental results unless it includes accountability for who is responsible for implementation, funding necessary to carry out the objectives, metrics and milestones to measure performance, and how Action implementation is tracked.

The following table will provide this information for each Action, with emphasis on the continued partnership approach to collaborative success.

Action—Each Action is described in sufficient detail to know what is proposed in support of the Goal to be achieved. Some Actions may take place system-wide or involve policy changes rather than on-the-ground projects.

Responsible Partners—This area identifies the partner organizations and agencies responsible for carrying out the Action, listed alphabetically. Participation as a partner may provide support in other forms such as funding and indicate the partner's willingness to be engaged in the action implementation alone or with others. Abbreviations for agencies and organizations used in this table appear on the following page.

Key Timeframe and Milestones—These items describe the important timeframes and milestones for completion of certain elements of an Action. Specific milestones will also provide incremental steps to completing an Action. These might include a funding stream accomplished or development of a model to be used in implementing an action. Many of these are indicated as ongoing, highlighting the continuous nature of an Action or activity.

Symbol	Cost Range
$	Less than $25K
$$	$25K - $100K
$$$	$100K - $500K
$$$$	$500K - $1M
$$$$$	Over $1M

Cost Range and Funding Source—This area of the table contains a cost range and identification of funding sources. The cost range is represented by $ corresponding with the amounts in the table above.

"*Within partner resources*" means funding for base level implementation able to be accomplished within operating resources.

When MCBP is the sole entity identified in an Action, "*within MCBP resources*" indicates the use of EPA CWA Section 320 funds allocated through the EPA/MCBP cooperative partnership as the primary source of funds.

Other special funds for all partners may indicate the need for grants, special funds, loans, or other appropriations to accomplish the Action.

Some supplemental funding needs are also identified when the level of implementation may be enhanced with additional resources.

Performance Measures—A performance measure allows for a quantitative measure of the effectiveness of an effort to implement an Action. It also provides details on the type of information that needs to be tracked or measured. The more general explanation of an environmental result may also be represented as a performance measure. For example, this could be described as "reduced flooding and improved water quality."

Actions Informed by MCBP Climate Adaptation Action Plan—These Actions are denoted with the 🔵 icon indicating they are consistent with Actions recommended in the MCBP Climate Adaptation Action Plan included on page 88 of this CCMP.

Abbreviation	Responsible Partner
ACT	Assateague Coastal Trust
ASIS	Assateague Island National Seashore
Delaware DNREC	Delaware Department of Natural Resource and Environmental Control
DNR	Maryland Department of Natural Resources
EPA	Environmental Protection Agency
LES-PRISM	Lower Eastern Shore Partnership for Regional Invasive Species Management
LSLT	Lower Shore Land Trust
MAEOE	Maryland Association for Environmental and Outdoor Education
MCBP	Maryland Coastal Bays Program
MDA	Maryland Department of Agriculture
MDE	Maryland Department of the Environment
MDEM	Maryland Department of Emergency Management
MDP	Maryland Department of Planning
MEA	Maryland Energy Administration
MHT	Maryland Historical Trust
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
OC	Ocean City
OPA	Ocean Pines Association
ORP	Oyster Recovery Partnership
PDA	Public Ditch Association
SHA	State Highway Administration
STAC	Science and Technical Advisory Committee
SU	Salisbury University
UMCES	University of Maryland Center for Environmental Science
UME	University of Maryland Extension
UMES	University of Maryland Eastern Shore
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey
VA DEQ	Virginia Department of Environmental Quality
VIMS	Virginia Institute of Marine Science
WC	Worcester County
WCPS	Worcester County Public Schools
WSCD	Worcester Soil Conservation District

Themes, Goals, and Actions Table

Theme 1: Provide Healthy Waters	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
Goal 1	**Reduce nutrient and pollutant loading in the watershed.**				
PHW 1.1 🔵	Provide funds and incentives to establish, improve, replace and maintain septic systems with Best Available Technology.	ACT, MDE, WC	Ongoing. Annual Bay Restoration Fund (BRF) funding to WC. Additional funding through state legislation. Improvements to wastewater septic systems.	$$$ BRF to WC. Other public and private funding sources.	Annual receipt of funding (BRF, other). Number of septic systems improved or replaced. Number of sewer connections. Reduction of nutrients to groundwater.
PHW 1.2	Promote meaningful interstate cooperation for nutrient reduction through watershed based planning strategies.	Delaware Center for the Inland Bays, Delaware DNREC, EPA, MCBP, MDE, Town of Chincoteague, Virginia DEQ	Ongoing. Development of collaborative interstate watershed based plans for nutrient reduction.	$ Within partner resources. State grant funding.	Decreased nutrient and bacteria levels toward meeting the Total Maximum Daily Load (TMDL) for Maryland Coastal Bays, including septic discharges.
PHW 1.3 🔵	Protect and increase wetlands and buffers in riparian zones and stream corridors.	Berlin, DNR, LSLT, MCBP, MDA, OC, OPA, WC, WSCD,	Ongoing. Education and outreach, workshops. Wetland/ buffer creation and restoration.	$$–$$$ Within partner resources. Grants and cost-share programs.	Increase in wetland and buffers acres. Improved habitat and ecosystem function.
PHW 1.4 🔵	Partner with local farmers and Public Ditch Associations (PDA's) to develop and implement farm specific land conservation and Nutrient Management Plans (NMP's) utilizing federal and state cost share programs and loans.	LSLT, MCBP, MDA, NRCS, PDA's, WSCD, UME	Ongoing. Education and outreach. BMP installations. Cost-share funding requested. Development and updating of NMP's.	$$–$$$ Within partner resources. Grants and federal cost-share programs.	Number of training workshops provided. Increased number of Best Management Practices (BMP's) installed. Number of acres treated by BMP's. Number of landowners implementing BMP's. Reduction in non-point source nutrient runoff. 100% of farm acreage in compliance with NMP's.
PHW 1.5 🔵	Continue to support the Clean Marina Initiative including technical assistance and outreach materials on pollution prevention.	DNR, MCBP	Ongoing. Education and outreach. Technical Assistance provided.	$ Within partner resources.	Increase the number of marinas participating by 20%. BMPs implemented. Reduction in pollutant loading.

Theme 1: Provide Healthy Waters	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
PHW 1.6	Quantify the volume of water and nutrients delivered from watershed ditches to the Coastal Bays to prioritize for nutrient reduction.	DNR, MCBP, USGS	As funding becomes available. Research and analysis of sources and inputs.	$$ No current funding identified. Possible future co-funding with USGS.	Identification of ditch sources and nutrient loads.
PHW 1.7	Maintain the policy of no new wastewater treatment plant discharges to waterways, and facilitate removal of point sources while requiring spray irrigation or other technologies instead.	MDE, WC	Ongoing. Updated Master Water and Sewer Plan and County Comprehensive Plan in 2026. MDE approval for groundwater discharge permit for Worcester County.	$$$–$$$$ Within partner resources. Federal and state grants and loans, and private funds.	Stable or decreased point source nutrient discharges. Increased spray irrigation acreage.
PHW 1.8	Provide environmental data and analyses collected offshore to inform coastal researchers about nutrient loading dynamics that affect the Coastal Bays through inlet flushing.	ASIS, DNR, USACE, UMCES	Ongoing as funding is available. Ecosystem data and reports. Development of model with research data.	$$–$$$ Within partner resources. Research grants.	Identify nutrient loading through inlet flushing.
PHW 1.9 🔵	Determine trends in air pollution inputs from the National Atmospheric Deposition Program monitoring site.	ASIS, DNR, USGS	Ongoing. Continued data for loading, Need trend analysis.	$–$$ Within partner resources.	Provide monitoring data on air pollution indices.
PHW 1.10	Conduct hazardous waste disposal programs for farm and residential hazardous materials.	WC	Ongoing. Annual collection events.	$–$$ Within partner resources.	Number of participants. Volume and type of collections. Reduction in toxic loading.
PHW 1.11	Identify the sources, loadings, fate and transport, and develop reduction strategies for emerging contaminants including Per- and polyfluoroalkyl substances PFAS, endocrine disruptors and microplastics.	ACT, MDE, UMES, WC	As resources are available. Inclusion of data collected and strategies in the WC Water and Sewer Plan. Findings of research by partners including ACT, UMES. Annual compliance reports from WC to MDE and customers. Development of state regulations.	$$–$$$ County enterprise and customer service fees.	Reduction of emergent contaminants entering Coastal Bays waterways. Number of sources identified. Performance and compliance with applicable permit conditions.

Theme 1: Provide Healthy Waters	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
Goal 2	**Protect and conserve groundwater.**				
PHW 2.1	Update the USGS surficial aquifer model with other known studies such as thermal imaging to prescribe solutions for water protection.	DNR, USGS	As funding is available. Application of models, methods and studies. One-two year model update project with USGS Water Science Center if funding becomes available.	$–$$ Might be co-funding available.	Better understanding of nutrient flow paths and consequences. Recommendations for ecosystem improvements.
PHW 2.2 🔵	Fund continued monitoring of nutrient inputs to the Coastal Bays from groundwater.	DNR, USGS	As funding is available; Groundwater monitoring plan. Secure matching funds for additional groundwater monitoring.	$$ Possible matching funds for additional groundwater monitoring.	Assess flow volumes, groundwater age and nutrient concentrations by land use sector.
PHW 2.3 🔵	Monitor and assess changes in Assateague Island groundwater resources related to climate variability.	ASIS	As funding is available	$–$$ Within partner resources.	Determine status and trends of ASIS groundwater resources, including saltwater intrusion.
PHW 2.4 🔵	Assess and report on quantity and quality of groundwater resources available for the Coastal Bays watershed.	WC	Ongoing. Source water protection reports with wellhead protection audits. Planning study for growth and water plant interconnection.	$–$$ Within partner resources.	Planning recommendations and priority levels for the Water Resources Element chapter of the WC County Comprehensive Plan. Completed water plant interconnections.
PHW 2.5	Consider development of technology and standards to advance graywater reuse.	MDE	Ongoing. Development of graywater reuse technology and standards.	$–$$ Within partner resources.	Graywater permits. Increased water conservation.

Theme 1: Provide Healthy Waters	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
Goal 3	**Develop and implement comprehensive watershed programs and strategies to achieve the TMDL standard.**				
PHW 3.1 🔵	Develop and implement Non-Point Source Management (A-I) Plans for all sub-watersheds in the Maryland Coastal Bays including plans requiring interstate coordination.	Delaware Center for the Inland Bays, Delaware DNREC, EPA, MCBP, MDA, MDE, VA DEQ, WC and municipalities	Ongoing—Complete all plans by 2030.	$$–$$$ Within partner resources. EPA 319 non-point source and other public and private grant funding.	Reduction in non-point source nutrient loading and achievement of the watershed TMDL. Receipt of non-point source funding to develop and implement plans.
PHW 3.2 🔵	Collect and report data for existing and future BMP's, including Agriculture, to track progress toward the successful implementation of the subwatershed plans, and allow for adaptive management.	Berlin, MCBP, MDA, NRCS, OC, OPA, WC, WSCD	Ongoing as watershed plans are developed and implemented. Create a permanent subcommittee of the Implementation Committee (IC) to oversee the progress of this action. Use MDA's "Conservation Tracker" database for BMP implementation. Possible use of TMDL Implementation Planning and Progress (TIPP) tool.	$$ Additional partner resources needed.	Annual update of BMP's implemented and input into the watershed plans.
PHW 3.3 🔵	Fund and implement retrofits, improvements and long-term maintenance of conveyances, structures and natural landscapes for stormwater management.	Berlin, DNR, MCBP, OC, OPA, WC	Ongoing. Implementation of approved projects.	$–$$$ Project specific. Public and private funding sources. Grants. Agency budgets.	Reduced flooding and improved water quality. Number of projects completed.
PHW 3.4	Evaluate a tracking approach for land use indicators including but not limited to land use/ land cover, impervious surfaces, amount of development occurring inside & outside of County Growth Areas/ Priority Funding Areas, and other land use and growth metrics.	Berlin, MCBP, MDP, OC, OPA, WC	End of 2026, conduct a planning charette to evaluate the feasibility of coordinating data collection. Updated MDP land use/ land cover parcel data. Review and incorporation of Comprehensive Land Use Plans as they are updated.	$ Within partner resources. Possible grant funding.	Development of a land use data tracking approach.

Theme 2: Protect Fish, Wildlife, and Their Habitat	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
Goal 1	**Update and implement a comprehensive Monitoring Plan, and Habitat Protection and Restoration Strategy, as separate components of the CCMP.**				
PFWH 1.1 🔵	Develop sustainable funding for all monitoring needs as a necessary component of the MCBP Monitoring Plan and Finance Strategy.	ASIS, DNR, MCBP, STAC	Ongoing. Completion of the Monitoring Plan and Finance Strategy.	$$ Plan Development within MCBP resources.	Development of adequate financing. Implementation of monitoring plan.
PFWH 1.2	Ensure that the recommended components within the Monitoring Plan, and Habitat and Restoration Strategy are considered each year for implementation in the MCBP and other partner's annual work plans.	MCBP and Partners	Annually, as the Monitoring Plan, and Habitat and Restoration Strategy are updated and implemented. Submission of annual Habitat and Leveraging Report.	$ Within MCBP and partner resources. Additional funding needed for enhanced monitoring capacity.	Development and implementation of specific activities in the Annual Work Plan consistent with the Monitoring Plan, Habitat and Restoration Strategy.
Goal 2	**Monitor and manage finfish, shellfish and other aquatic species.**				
PFWH 2.1	Work with partner agencies to manage and provide stock assessment data for recreationally and commercially important finfish and shellfish species to the targets and thresholds described in state and federal fisheries management plans.	DNR	Ongoing. Periodic updates of finfish and shellfish stock status. Annual management evaluations report. Compliance reporting to Atlantic States Marine Fisheries Commission.	$ Within DNR resources.	Assessment, monitoring and reporting on the status of fishery resources. Ability to adaptively manage sustainable fisheries.
PFWH 2.2	Continue to improve the quality and timeliness of commercial landings reports by implementing online, multi-platform tools for real-time reporting for finfish and shellfish.	DNR	Ongoing. Development of digital reporting tools.	$$ Additional partner resources needed. Potential funding through Atlantic Coastal Cooperative Statistics Program and other funding partners.	More timely and accurate data reporting from commercial watermen. Improved stock assessments.

Theme 2: Protect Fish, Wildlife, and Their Habitat	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
PFWH 2.3	Provide the public with reports of finfish and shellfish harvest results.	DNR	Dissemination of information as available through Fisheries Management Plan updates and Atlantic States Marine Fisheries Commission compliance reports. Data available through the Atlantic Coastal Cooperative Statistics Program website.	$ Within partner resources.	Improved public understanding of fisheries harvest information.
PFWH 2.4 🔵	Conduct diamondback terrapin and horseshoe crab spawning surveys and share data to partner management agencies and the public.	DNR, MCBP	Horseshoe crab surveys ongoing. Terrapin surveys on hold pending possible development of regional protocol and database.	$ Within partner resources. Volunteer resources.	Scientific data for management of species and habitat. Number of surveys conducted. Compliance with horseshoe crab spawning survey requirements of the Atlantic States Marine Fisheries Commission
PFWH 2.5	Complete an annual survey of shellfish resources within Maryland's Coastal Bays, and update the Coastal Bays Hard Clam and Blue Crab Fisheries Management Plan.	DNR, MCBP	Ongoing. Completion of shellfish surveys.	$$ Within partner resources. Additional future resources needed.	Assessment of shellfish resources. Incorporation of hard clam data into annual Coastal Bays Report Card.
PFWH 2.6	Assess the overall health of aquatic species and habitats, including the effects of emerging contaminants and microplastics.	DNR, EPA, UMES	Ongoing. Research and reports. Completion of Index of Biotic Integrity as a part of the EPA National Coastal Condition Assessment every 5 years.	$$–$$$ Within partner resources. Additional resources needed. Grant funding.	Assessment and reporting of data and development of management strategies.
PFWH 2.7 🔵	Promote and support responsible and profitable shellfish aquaculture with incentives to assist production, and education and training on best practices to growers and the public.	DNR, MCBP	Ongoing. Implementation of outreach and education activities. Providing incentives to aquaculture growers. Quarterly meetings of the Aquaculture Coordinating Council.	$$ Within partner resources.	Number of responsible and profitable aquaculture operations in the watershed. Reduced conflicts with waterway users. Refined Aquaculture Siting Tool. Enhanced industry performance, standards and best management practices. Implementation of outcomes from the Aquaculture Coordinating Council.

Theme 2: Protect Fish, Wildlife, and Their Habitat	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
PFWH 2.8 🔵	MCBP will work with partners to continue the oyster gardening community science program.	MCBP, ORP, Volunteers	Ongoing support to volunteer oyster gardeners.	$ Within MCBP resources. ORP and volunteer resources.	Number of volunteer oyster gardeners. Numbers of oysters grown. Improved ecosystem function.
Goal 3	**Monitor and manage aquatic and estuarine habitats.**				
PFWH 3.1 🔵	Continue research and support for management, protection and restoration of seagrass beds and exploration of various methods of monitoring.	ASIS, DNR, MCBP, UMES, VIMS	Ongoing, Annual collection of data. Findings of DNR Report on alternative survey methods to General Assembly 12/25. Findings of ASIS funded research on seagrass resiliency. Explore seagrass bed restoration opportunities.	$–$$ Within partner resources. Additional resources needed.	Selection of new survey methods. Protection and possible expansion of mitigation of existing seagrass beds including mitigation during restoration projects.
PFWH 3.2 🔵	Protect horseshoe crab and other wildlife populations by preserving bay beaches and other bottom habitats.	DNR, MCBP	Ongoing preservation and restoration efforts.	$–$$$ Within partner resources. Grant funding. Additional resources needed.	Area of habitat protected, species population survey data.
PFWH 3.3 🔵	Support efforts to monitor and assess Harmful Algae and Phytoplankton including special Brown Tide analysis.	ASIS, DNR, MCBP, NOAA	Ongoing monitoring efforts including the NOAA Phytoplankton Monitoring Network. Collection and processing of data.	$–$$ Within partner resources. Additional resources needed.	Detection of presence or absence of harmful algal bloom species. Protection of public and aquatic ecosystem health.
PFWH 3.4 🔵	Maintain and enhance bay water quality monitoring programs to assess nutrient loading, bacteria levels and living resource responses.	ACT, ASIS, DNR, MCBP, UMCES, WC	Ongoing monitoring efforts. Addition of continuous monitoring sites. Collection and processing of data.	$$$ Within partner resources. Additional resources needed.	Increase or decrease in Bay ecosystem health indicators. Adequate monitoring coverage. Enhanced data from continuous monitoring sites.
PFWH 3.5	Continue to support sustained improvements in reef enhancement by sponsoring permits for the Ocean City Reef Foundation.	DNR, OC	Issuance of necessary permits. Monitor possible transfer of permit issuance to DNR. Ongoing reef enhancement activities.	$ Within OC resources.	Timely issuance of permits. Enhanced offshore reef habitat and marine species.
PFWH 3.6	Monitor near shore plant and animal species and habitat.	DNR, MCBP	Ongoing monitoring efforts.	$–$$ Within partner resources.	Improved species protection, health and abundance. Protection and restoration of habitat.

Theme 2: Protect Fish, Wildlife, and Their Habitat	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
PFWH 3.7 🔵	Asses the historic presence and extent of marshes with the potential for marsh migration in response to sea level rise.	Audubon Mid-Atlantic, DNR, MCBP, USFWS	Ongoing monitoring efforts. Inclusion of data in the Habitat and Restoration Strategy.	$–$$ Within partner resources. Grant funding.	Identification of potential marsh migration corridors. Number of acres identified.
PFWH 3.8	Continue to expand and update data and information via the Coastal Atlas to monitor coastal conditions and inform protective actions.	DNR	Ongoing expansion of data input into the Coastal Atlas.	$ Within DNR resources.	Expanded and updated Coastal Atlas. Improved resource management decision making.
PFWH 3.9 🔵	Monitor gains and losses and conduct assessments of wetlands in the watershed to prioritize creation, conservation and restoration activities.	ASIS, DNR, MCBP, MDE, USFWS	Ongoing. Monitoring and assessment reports. MDE regular reporting on permitting gains and losses.	$$–$$$ Within partner resources.	Improved and increased wetlands resources in the watershed. Improved data on saltmarsh elevation through the use of Surface Elevation Tables throughout the watershed.
PFWH 3.10 🔵	Conduct monitoring and assessment to characterize the health of streams in the Coastal Bays Watershed.	DNR, MCBP, MDE, UMCES	Ongoing. Periodic Stream Water Chemistry and Biological Monitoring Reports.	$–$$ Within partner resources. Volunteer resources.	Recruitment and retention of volunteers. Generation of reliable stream health data. Targeting streams and subwatersheds for necessary improvements.
PFWH 3.11	Use stream characterization health data to identify and pursue potential aquatic habitat management, stream protection and restoration projects.	MCBP, MDE, DNR	Ongoing. Completion of watershed planning for implementation projects. Possible use of MDE screening tool under development.	$$–$$$ Within partner resources. Non-point source funding, Other grant funding.	All A-I watershed plans completed by 2030. Projects planned for each subwatershed.

Theme 2: Protect Fish, Wildlife, and Their Habitat	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
Goal 4	**Monitor and manage plants and wildlife in the watershed.**				
PFWH 4.1 🔵	Monitor and reduce the presence of terrestrial and aquatic invasive species within the Coastal Bays watershed through accepted best management practices.	DNR, LES - PRISM, MCBP, MDA and Partners	Ongoing monitoring. Periodic public outreach and removal activities by partners.	$–$$ Within partner resources. Volunteer resources.	3–5 volunteer invasive removal activities annually. Number of properties monitored. Number of public agency or organization sponsored invasive removal efforts.
PFWH 4.2	Use existing indicators, monitoring data and game harvest information to protect and restore plants and animals including rare, threatened and endangered species in the watershed.	ASIS, DNR, MCBP, USFWS	Ongoing. Development and implementation of monitoring plan. Periodic surveys and reports	$–$$ Within partner resources.	Stabilized or increased presence of rare, threatened and endangered species in the watershed.
PFWH 4.3	Monitor bird populations in the watershed to identify habitat and species enhancement needs and opportunities.	Audubon Mid-Atlantic, DNR, MCBP, USFWS	Ongoing. Periodic reports for bird populations conducted by partners and volunteers. .	$–$$ Within partner resources.	Identified species and habitat protection needs and opportunities.
PFWH 4.4 🔵	Encourage and require where appropriate, native vegetative plantings and conservation landscapes on public and private lands to enhance biodiversity..	LSLT, MCBP, WC and other Partners.	Ongoing review of land development plans. Periodic outreach, workshops and demonstration projects.	$–$$ Within partner resources. Grants.	Improved land development code requirements. Number of planting projects and acres of native vegetation planted throughout the watershed on all land uses.
Goal 5	**Monitor and manage terrestrial habitats.**				
PFWH 5.1 🔵	Utilize Best Available Technology to assess forest health including composition, tree cover and including urban tree canopy.	ASIS, DNR	Periodic assessments and field surveys including U.S. Forest Service inventory surveys, Chesapeake Bay Program land use/ land cover surveys and possible County or municipal surveys. ASIS conducts annual forest health monitoring at permanent plots along Assateague Island.	$ Within partner resources.	Reports and data sets related to changes in forest cover.

Theme 2: Protect Fish, Wildlife, and Their Habitat	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
PFWH 5.2 🔵	Educate and provide support for private landowner afforestation and forest restoration opportunities including the preparation of Forest Stewardship Plans (FSP's)	DNR, LSLT, WC	Ongoing outreach to landowners and preparation of FSP's by a Maryland Certified Forester.	$–$$ Additional resources needed for FSP's preparation and restoration opportunities. Grants.	Number of FSP's prepared for landowners. Implementation of recommended FSP's practices. Acres of forest restoration.
PFWH 5.3	Coordinate efforts to maintain forest health and extent for publicly owned lands.	DNR, WC	Preparation of FSP's. Periodic review of public forested lands. Annual report development.	$–$$ Within partner resources. Additional resources if contracted for FSP's preparation.	FSP's prepared for 75% of public forested lands within 10 years. Implementation of recommended practices in FSP's.
PFWH 5.4 🔵	Manage large extents of turfgrass areas in the watershed for improved habitat and ecosystem function reducing the need for chemical application.	Berlin, DNR, LSLT, OC, OPA, UME, WC	Ongoing research, education and outreach to large landowners (public agencies, corporate lands, golf courses)	$ Within partner resources for outreach. $$ Grants for restoration and demonstration meadows and natural area creation.	Number of workshops and seminars held. Acres of turfgrass restored to natural areas. Less chemicals used for turf maintenance.
PFWH 5.5 🔵	Manage less productive agricultural lands for improved habitat and ecosystem function.	LSLT, MCBP, MDA, WSCD	Ongoing. Outreach to farmers and rural landowners.	$ Within partner resources for outreach. $$-$$$ for restoration efforts. Grants.	Number of workshops and seminars held. Number of landowners reached. Area of restoration on these lands.

Theme 3: Create Resilient Communities & Ecosystems	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
Goal 1	**Enhance resilience of Coastal Bays ecosystems to natural disasters, sea level rise, and other climate change stressors.**				
CRCE 1.1 🔵	Identify and prioritize ecosystem restoration opportunities in the watershed.	ASIS, DNR, LSLT, MCBP, USFWS, WC	Ongoing. Development of potential restoration projects in each bay watershed.	$ Within partner resources. $$ additional resources if a contractor is needed to assist with the development of project portfolio. Grant funding.	Prioritized list of restoration opportunities. Grant funding obtained and restoration projects planned. Projects ready for funding.
CRCE 1.2 🔵	Restore marshes, shorelines, islands and upland ecosystems to natural conditions within the Coastal Bays watershed, including post restoration monitoring for adaptive management.	ASIS, DNR, LSLT, MCBP, USFWS, WC	Ongoing. Design and implementation of restoration project efforts.	$$–$$$$$ Requires grant and agency funding. May require multi-year grant funding from several sources.	Area and linear ft. of ecosystem restoration accomplished. Improved management of natural resources with post restoration monitoring.
CRCE 1.3 🔵	Work with emergency management agencies and other partners to develop recovery plans to support ecosystem conservation and resilience in the wake of natural disasters.	ASIS, Berlin, MCBP, MDEM, OC, OPA, WC	Ongoing as Emergency Management, Hazard Mitigation and Comprehensive Plans are prepared.	$ Within partner resources.	Ecosystem value and function are considered in all Emergency Management Plans by 2030. Ecosystem conservation and restoration projects implemented after natural storm and disaster occurrences.
CRCE 1.4	Research the effects of climate stressors on Coastal Bays ecosystem indicators.	ASIS, DNR, EPA, MCBP, UMCES	Ongoing research within the agency scope of expertise. Annual input into the MCBP Report Card.	$$–$$$ Additional funds for partner agency monitoring and research.	Data sets specifically related to climate stressors for Ecosystem Health Report. Less mortality of plant and animal species related to climate.
CRCE 1.5 🔵	Explore opportunities to improve permitting efficiency related to ecosystem restoration and resiliency projects.	DNR, EPA, MCBP, MDE, OC, USACE, WC	Ongoing. Create periodic meeting opportunities with permitting agencies.	$ Within partner resources.	More effective permit language and timeframes for ecological restoration projects.

Theme 3: Create Resilient Communities & Ecosystems	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
Goal 2	**Enhance resilience of community assets and infrastructure to natural disasters, sea level rise and other climate change stressors**				
CRCE 2.1 🔵	Partners will identify and prioritize climate adaptation strategies and actions to build resilience for protection of community assets including recreational amenities and infrastructure into local plans.	MCBP and Partners	Ongoing. Periodic updates to county and municipal plans including vulnerability assessments.	$ Within partner resources. Partners may need additional resources for relocation and restoration needs.	More comprehensive resiliency planning for community and recreational assets into local plans. More resilient infrastructure as protective plans are implemented.
CRCE 2.2 🔵	Encourage public and private marina owners to maintain and adapt existing marina facilities including piers, boat ramps, and kayak launch areas to enhance resilience to impacts of storm inundation and SLR.	DNR, WC	Updated County Land Preservation, Parks and Recreation Plan every three years. Periodic technical assistance and funding through DNR.	$$–$$$ WC may need additional resources. Federal and state grants.	Improved public access for recreation. Increased longevity and less storm damage to these facilities from changing climate.
CRCE 2.3 🔵	Identify potential toxic risks from facilities that may be affected by climate change stressors, land subsidence and natural disasters as part of hazardous mitigation and resilience planning.	Berlin, MDE, OC, OPA, SHA, WC	Periodic updates to hazard mitigation, source water protection and other resilience plans.	$ Within partner resources.	Updated data set of facilities and possible contaminants impacted by natural occurrences. Coordinated effort by MDE to provide assistance.
CRCE 2.4 🔵	Consider adopting or modifying local standards to enhance resiliency for flood protection, and stormwater impacts including periodic review of locally based sea level rise projections.	Berlin, MDE, OC, OPA, WC	Periodic review of sea level rise projections and review of local codes. Updates to required local nuisance flooding plans every five years. Updates to state stormwater requirements.	$ Within partner resources.	Review and possible update to local codes. Better flood and risk reduction of local infrastructure and assets. Participation in the FEMA Community Rating System program.
CRCE 2.5 🔵	Identify and document cultural and historic resources that may be impacted by climate stressors and natural disasters to inform resilience strategies.	Beach to Bay Heritage Area, MDP, MHT, WC	Initial inventory and resource assessment.	$ Within partner resources.	Adaptive management strategies undertaken to protect cultural and historic resources.

Theme 3: Create Resilient Communities & Ecosystems	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
Goal 3	**Implement and periodically update the MCBP Climate Action Plan**				
CRCE 3.1	Ensure that the recommended adaptation actions within the Climate Change Action Plan (CCAP) are considered each year for implementation in MCBP and partner work plans.	MCBP and Partners	Annual review of CCAP and inclusion of adaptation actions during Work Plan preparations.	$ Within MCBP and partner resources.	Number of CCAP adaptation actions accomplished each year through implementation of partner work plans.
Goal 4	**Coordinate with partners to develop and implement a Maryland Coastal Bays Sediment Management Plan (SMP)**				
CRCE 4.1 🔵	Implement recommendations from and update the USACE Ocean City Water Resources Study (OCWRS) of 1998.	ASIS, MCBP, OC, USACE, WC	Periodic review and assessment of the OCWRS to determine current applicability and develop progress timeline. Possible 2026 update to study.	$ Within existing resources for review and assessment. $$–$$$$$ Need additional multi-year funding for OCWRS and implementation projects. Federal and state funding and local share match.	Assembly of necessary funding. Acres of habitat enhanced. Number of projects completed.
CRCE 4.2 🔵	Perform periodic renourishment per the Atlantic Coast Project authorization in order to maintain Ocean City beaches and dunes for storm damage reduction.	OC, USACE	4 year nourishment cycle based on funding, survey and needs. Continued USACE project authorization.	$$$–$$$$$ Based on availability of federal funding and local share.	Linear miles of beach and dune nourished. Positive cost-benefit for property and infrastructure storm damage reduction.
CRCE 4.3 🔵	Continue the Assateague Island North End Restoration Project to restore the natural sediment supply to the barrier island.	ASIS, USACE	Annual sand bypassing and sediment restoration based on funding, survey needs and availability of dredge equipment. Annual ocean shoreline position and beach topography surveys along Assateague Island.	$$$–$$$$ Based on availability of federal funding.	Improved navigability of OC Inlet and Coastal Bays. Restoration of sand supply to Assateague Island. Data collected through the annual beach and shoreline surveys.

Theme 3: Create Resilient Communities & Ecosystems	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
CRCE 4.4 🔵	Implement the MCBP Sediment Management Plan to utilize sediment for restoration projects and habitat enhancement in the Coastal Bays.	ASIS, DNR, MCBP, MDE, OC, USACE	Completion of the MCBP Sediment Management Plan. Development and coordination of dredging schedule and project timelines.	$$$–$$$$$ Requires multi-agency funding through appropriations, grants.	Assembly of necessary funding. Coordination of habitat restoration projects with dredging needs, availability of sand.
CRCE 4.5 🔵	Establish and maintain a Dredging Advisory Group (DAG) to coordinate and implement the Sediment Management Plan.	ASIS, DNR, EPA, MCBP, MDE, OC, USACE	Periodic scheduling and meeting with DAG. Periodic progress reports.	$ Within partner resources.	Increased coordination and public participation for resources to complete MCBP Sediment Management Plan and OCWRS.
CRCE 4.6 🔵	Maintain navigational channel marking, mapping, and maintenance dredging to ensure public access to waterways in the Coastal Bays.	DNR, NOAA, OC, USACE, U.S. Coast Guard	Ongoing if coordination and agency participation is approved and implemented. Coordinate with USACE, NOAA and USCG for nautical map updates and channel markings.	$$–$$$$ Requires multi-agency coordination and funding.	Improved navigational channel maintenance. Improved public access, boater safety and sensitive species protection.
Goal 5	**Monitor and conduct research to assess conditions and identify trends and challenges to guide resilience programs and policies.**				
CRCE 5.1 🔵	Monitor chemical, ecological, and spatial trends to assess the impacts of sea level rise and other climate change stressors to inform a long-term science agenda.	MCBP-STAC	Ongoing monitoring. Periodic updates to STAC Science Agenda	$$–$$$ May require additional funding through research grants.	Development of research data sets. Adaptive management strategies for habitat and species.
CRCE 5.2 🔵	Conduct an assessment for research and monitoring needs and recommend priority assignments and schedule.	MCBP-STAC	Annual science planning through STAC with periodic updates. Research grant needs and funding opportunities identified.	$ Within partner resources.	Update to MCBP Monitoring Plan. Schedule of research proposals.
CRCE 5.3	Partners will collect, manage and share GIS data that are publicly available for the watershed.	ASIS, DNR, MCBP, SU, WC	Ongoing. Periodic meetings to coordinate data collection.	$ Within partner resources. Some additional resources may be required to maintain GIS data hosting.	Coordination of data layers for Geographic Information. Better geo-spatially related data driven decisions.

Theme 3: Create Resilient Communities & Ecosystems	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
Goal 6	**Promote and facilitate conservation of land, natural resources, energy and manufactured materials.**				
CRCE 6.1 🔵	Support efforts to retain farming and forestry as viable land uses in the watershed.	DNR, MCBP, MDA, WC, WSCD	Ongoing coordinated outreach among partner agencies. Development of common agenda for program support. Monitor actions by local elected and appointed officials regarding land use decisions.	$–$$ Within partner resources.	Improved support among elected officials for agriculture and forestry as important and viable land uses in the watershed. Public support for economic incentives for farming and forestry.
CRCE 6.2 🔵	Promote and support land conservation in the watershed to protect and enhance farms, forests and habitat.	DNR, LSLT, MDA, NRCS, WC	Ongoing. Develop funding opportunities for land conservation and protection. Establish land conservation goals.	$ Planning within partner resources. $$$–$$$$$ Funds for land easement and acquisition through state and federal program funds, grants, private donations, foundation funding.	Acres of land conserved and protected through acquisition and easements increased from 26% to 30% by 2030 watershed wide, including at least 3,000 acres in the new northern bays Rural Legacy Area. Increased species and habitat protection through conserved lands.
CRCE 6.3 🔵	Encourage and support waste reduction, recycling and re-use policies and programs for commercial, institutional, governmental and residential generators.	Berlin, MDE, OC, OPA, WC	Ongoing outreach programs and recycling efforts. MDE periodic updates to State mandated programs and policies.	$ Outreach and coordination of citizen programs within partner resources. State and federal grants. $$–$$$$ More robust recycling and waste stream reduction programs may need additional partner resources.	Number of watershed citizen cleanup efforts. Trash free waters and other grant funded programs completed. Improved county and municipal compliance to MDE zero waste strategy by 2030. Increase in waste reused and recycled. Improved source reduction.

Theme 3: Create Resilient Communities & Ecosystems	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
CRCE 6.4 🔵	Encourage the preservation and creation of ecologically beneficial site features for new and existing public and private land development.	Berlin, DNR, MDP, OC, OPA, SHA, WC	Ongoing. Development of improved standards for ecologically beneficial site features for land development.	$ Review and revise municipal standards within partner resources. $$–$$$$ Grant funding necessary for retrofits or demonstration projects.	Improved requirements for site design standards. Development of publication materials and workshops held for land review agencies, land development community and HOA's. Natural resource areas protected and new areas created.
CRCE 6.5 🔵	Protect cultural, historical, and natural resource areas.	Beach to Bay Heritage Area, LSLT, MHT, WC	Updates to county and local comprehensive land use plans, zoning codes, historic and preservation plans and critical area mapping.	$–$$ Review and revision of plans and codes within partner resources.	Review and improvement to local plans and codes to ensure these areas have appropriate protective standards and resources available. Increased protection and conservation of the resources identified.
CRCE 6.6	Support the development and implementation of energy conservation practices and clean energy programs while recognizing concerns for impacts of specific projects.	Berlin, MDE, MEA, OC, OPA, WC	Ongoing. Continued development, implementation and compliance with standards and practices established by state and local governments. Outreach to businesses and consumers.	$ Continued development of standards and practices and consumer outreach within partner resources. $$–$$$$$ Funds for energy incentive programs and municipal retrofits and construction would require federal, state, local and public utility funding.	Meet required clean energy standards or goals through improved standards and incentives at consumer, business and government levels. Support for renewable clean energy sources by state and local governments. Reduction in greenhouse gas emissions.
CRCE 6.7 🔵	Support development of low-impact transportation and recreation modalities including walkable, bikeable and water use trails throughout watershed.	Berlin, MCBP, OC, OPA, WC	Ongoing. Completion and phased implementation of WC Greenways Master Plan. Installation of trails in MCBP and partner managed properties, including accommodations for physically disabled persons.	$$–$$$$ Within partner resources for planning. Additional funds for trail and greenway construction needed. Grant funding.	Number and length of new trails developed. Increased accessibility for residents and visitors to watershed area sites and resources.

Theme 4: Develop Public Engagement and Partnerships	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
Goal 1	**Support the NEP program effort through the MCBP program administration and Management Conference.**				
DPEP 1.1 🔵	Implement and periodically revise a Communication, Education and Outreach Plan of the CCMP to ensure community involvement.	MCBP	Ongoing. Annual updates to Plan with partner and CAC support.	$ Within MCBP resources.	Plan implemented and supported by CAC. Number of Plan activities completed annually. Program support through collaborative outreach efforts.
DPEP 1.2	Implement and periodically revise a Finance Strategy that will establish long-term financial sustainability to implement the CCMP through diverse resources and partners.	MCBP	Update MCBP Finance Strategy by 2026. EPA approval.	$ Within MCBP resources.	Strategy developed by MCBP and adopted by Policy Committee. Number of financing actions completed annually. Program actions completed through successful funding.
DPEP 1.3	Develop, implement, and periodically revise a Science and Research Plan to inform scientific decision making relating to the CCMP.	STAC	Develop Plan by 2026. Periodic updates as necessary.	$ Within partner resources	Plan developed and adopted by STAC. Number of science and research actions funded and implemented. Resulting data applied to CCMP actions.
DPEP 1.4	Develop workplans for approval and funding from EPA and other grantors to implement actions in the CCMP.	MCBP	Ongoing as required by EPA and other grantors. Management Conference and EPA approval as necessary. 2030 conduct CCMP update to evaluate implementation of CCMP Goals and Actions and modify as necessary.	$ Within MCBP resources.	Workplan actions from CCMP completed or significant progress achieved.
DPEP 1.5	Engage the partners and watershed community through regularly scheduled meetings of the Management Conference committees.	MCBP and CCMP Committee Partners	Periodic regular meetings. Public announcement of meeting schedules and outcomes.	$ Within MCBP resources.	Measurable progress toward CCMP actions through regular engagement of MCBP staff, MCBP Board, STAC, IC, CAC and PC.

Theme 4: Develop Public Engagement and Partnerships	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
Goal 2	**Promote environmental literacy for the public through education, outreach, communication and engagement activities.**				
DPEP 2.1 🔵	Collaborate with watershed residents and community organizations to discuss climate resiliency planning and implement responsive actions.	MCBP and Partners	Ongoing. Periodic community workshops and meetings for public engagement and support.	$ Within MCBP resources.	Three community events annually. Completed actions from Climate Action Plan with community support.
DPEP 2.2 🔵	Deliver direct educational opportunities such as workshops, events, and programs to explore the watershed, increase knowledge, and cultivate a sense of place for individuals and community groups.	MCBP and Partners	Ongoing. Seasonal opportunities for outreach and field exploration.	$–$$ Within MCBP resources and grants.	Number of participants reached in educational programs. Expanded programs and events offered annually.
DPEP 2.3 🔵	Develop and translate findings into learning resources (e.g., Homeowner's Guide, Report Card) to promote research, restoration, and general watershed health including stormwater management.	MCBP, UMCES and Partners	Ongoing. Annual and periodic guides, and public communication pieces.	$–$$ Within partner resources.	Number of watershed residents reached with outreach resources. Increased actions by homeowners for watershed health improvement.
DPEP 2.4	Provide information and promote events through digital communication including social media platforms, press releases, and newsletters.	MCBP and Partners	Ongoing. Regularly scheduled communication items.	$ Within MCBP and partner resources.	MCBP to reach at least 10,000 people annually through social media and send 10 press releases and 12 digital newsletters annually. ASIS visitor viewing of park films to reach 10,000 views annually. Other partner metrics for public events to be reported.

Theme 4: Develop Public Engagement and Partnerships	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
DPEP 2.5 🔵	Communicate to local businesses, watershed partners and residents the beneficial relationship of ecosystem health to economic development, tourism, recreation and quality of life.	MCBP, UME	Ongoing. Periodic meetings with business and tourism leadership. Annual Leveraging Report.	$ Within MCBP and partner resources.	Increased community support for MCBP programs. Better understanding of the ecosystem value of natural resources. Increased funding for MCBP programs.
DPEP 2.6 🔵	Collaborate on education, outreach and engagement programs related to marine issues including responsible use by local stakeholders, marine debris and trash free waters.	DNR, EPA, MCBP, NOAA, OC	Ongoing. Scheduled public events including marine debris and trash cleanup. Responsible water user education workshops.	$ Within partner resources. Local and federal grants.	Numbers of volunteers participating in community clean up programs. Volume of debris collected annually. Better individual understanding of and participation in personal pollution reduction strategies. Improved stewardship practices for water users.
DPEP 2.7	Facilitate stakeholder meetings to share information, collect feedback, and educate anglers on the purpose of fisheries management policies.	DNR	Ongoing. Periodic stakeholder meetings.	$ Within partner resources.	Community understanding and cooperation with fisheries management strategies. Better understanding of the species and aquatic resources and adherence to the regulations.
DPEP 2.8 🔵	Provide outreach for integrated pest management including habitat for birds, bats and natural predators.	LSLT, MCBP, UME	Ongoing. Periodic meetings and workshops.	$ Within partner resources.	Better pest management without chemical applications. More impactful homeowner stewardship. Less mortality to bird, insect and other species.
DPEP 2.9 🔵	Educate the public about "best practices" for water conservation, well safety, and septic system management.	MCBP, UME, WC	Ongoing. Periodic meetings and workshops and integrated outreach.	$ Within partner resources.	Better homeowner BMP's for water quality and conservation achieved. Improved septic system maintenance. Reduced incidence of well contamination.

Theme 4: Develop Public Engagement and Partnerships	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
DPEP 2.10 🔵	Inform the public about farm conservation practices and support local farms, food and fiber.	MCBP, WSCD	Ongoing. Periodic meetings, workshops and integrated outreach.	$ Within partner resources.	Increased public support for and understanding of farms and farm products.
DPEP 2.11 🔵	Provide education and outreach to small acreage landowners and those with backyard habitat and forests through the Master Gardener, Watershed Protection and Restoration and Maryland Woodland and Watershed Stewards programs.	LSLT, MCBP, UME, WC	Ongoing. Specific program scheduled outreach.	$ Within partner resources.	Increased numbers of participants in the Master Gardener, Watershed Protection and Restoration and Maryland Woodland and Watershed Stewards programs. Better stewardship of these small acreage lands.
DPEP 2.12 🔵	Promote responsibly sourced local seafood and shellfish to inform consumers and support commercial fisheries.	MCBP, MDA	Ongoing. Educational literature and integrated outreach. Meetings of the Seafood Marketing Advisory Council three times annually.	$ Within partner resources.	Number of specific outreach and marketing activities. Increased support and sales of locally sourced seafood and shellfish.
DPEP 2.13 🔵	Sponsor Beach District Planting and Bayscape Planting programs to provide water quality and habitat benefits.	OC	Ongoing. Periodic application. Cost-share to landowners.	$–$$ Within partner resources. Mitigation funds.	Habitat improvement. Engagement of volunteers. Numbers of BMP's and grants implemented at the small scale level.
DPEP 2.14	Coordinate local educational and volunteer efforts to assist with stranded and injured animals throughout the watershed.	DNR, MCBP, National Aquarium	Ongoing. Annual volunteer trainings. Annual response and rehabilitation reports to NOAA and USFWS.	$$$ Within partner resources.	Injured and stranded animal protection and rehabilitation. Number of responses. Number of volunteers and volunteer hours.
DPEP 2.15 🔵	Enhance public awareness and information resources for public recreational facilities, and increase opportunities to access land and water based activities.	Berlin, DNR, MCBP, OC, OPA WC	Ongoing. Periodic updates to existing information.	$–$$ Within partner resources.	Increased awareness and use of public access points.

Theme 4: Develop Public Engagement and Partnerships	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
DPEP 2.16 🔵	Conduct public outreach regarding hazardous materials spill and disposal contact information.	MCBP, WC	Ongoing. Periodic updates and notices to residents.	$ Within partner resources	Update contact information annually. Hold at least one hazardous waste collection event annually. Reduce improper disposal incidences.
DPEP 2.17 🔵	Encourage community members and businesses to implement bay friendly lawn care practices to reduce chemical run-off from residential and developed areas through education and outreach.	LSLT, MCBP, UME	Ongoing. Special workshops. Integrated outreach.	$ Within partner resources. Grants for demonstration and mini grants.	More responsible application of lawn care chemicals to improve water quality.
Goal 3	**Coordinate with MCBP partners to develop and deliver academic programming.**				
DPEP 3.1	Support the WC public and private schools and homeschool groups with resources and curricula development for environmental literacy, and the facilitation of meaningful outdoor experiences for K-12 students.	MCBP, WCPS and Partners	Ongoing. Hiring of Environmental Literacy Specialist. Development and delivery of programs and outdoor experiences. Completion of WCPS District Environmental Literacy Plan.	$ Within partner resources for three years. Future grant funding needed.	Number of students and schools reached with literacy programs and outdoor experiences. Number of lessons and programs delivered to students. Improved student environmental literacy and stewardship.
DPEP 3.2	Provide programming and other education opportunities to higher education undergraduates and graduates, with a specific target of the Lower Shore area and higher education institutions such as UMES, SU, and Wor-Wic Community College.	MCBP, SU, UMES and Partners	Ongoing. Field trips. In-class lectures. Graduate research support. Higher education environmental literacy support. Accreditation of UMES Green Infrastructure Certification Program.	$–$$ Within partner resources.	Increased watershed stewardship and environmental literacy. Partnership development. Number of programs provided. Number of student participants.

Theme 4: Develop Public Engagement and Partnerships	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
DPEP 3.3	Provide and facilitate professional development opportunities for both K-12 formal and informal educators with an emphasis on the Coastal Bays watershed.	MAEOE, MCBP, WCPS	Ongoing. Annual summer professional development. Special workshops. Annual MAEOE Conferences and Program Evaluations.	$ Within partner resources.	Enhanced teaching skills and strategies among educators. Improved access to educator resources and materials. Increased knowledge and awareness of local issues. Number of teacher workshops delivered. Number of educators receiving training.
DPEP 3.4	Support the Maryland Association of Environmental and Outdoor Education (MAEOE) and other specialized education organizations.	MAEOE, MCBP	Ongoing. MCBP remains a current certified Green Center. Annual MAEOE Conferences and Program Evaluations.	$ Within partner resources.	Maintain Green Center certification. Number of Green Schools supported. MCBP involvement in annual conference. 400 attendees at MAEOE Conference.
Goal 4	**Cultivate volunteer participation in all aspects of community science, education and outreach activities.**				
DPEP 4.1	Provide annual volunteer opportunities to individuals and community service organizations via events, festivals, property management and land stewardship.	MCBP and Partners	Ongoing. Special events. Event calendar.	$–$$ Within partner resources. Special event funding.	Number of events held. Numbers of volunteers engaged.
DPEP 4.2 🔵	Provide training for community scientists to monitor and survey natural resources, fish, and wildlife populations.	DNR, MCBP	Ongoing. Community scientist training events and programs.	$–$$ Within partner resources.	Number of community citizen scientists trained and engaged. Improved data collection and species management.
DPEP 4.3	Recognize the contributions at many levels, of citizens, volunteers and organizations devoted to conservation in the Coastal Bays watershed.	MCBP and Partners	Ongoing. Multiple recognition events and opportunities.	$ Within partner resources.	Continued support of volunteers and organizations in the watershed. Widespread recognition of the contribution of others in MCBP activities.

Theme 4: Develop Public Engagement and Partnerships	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
DPEP 4.4 🔵	Continue Horseshoe Crab and Terrapin counts and promote the use of cull rings and Turtle Exclusion Devices on all recreational pots.	DNR, MCBP	Ongoing. Outreach at specific events.	$ Within MCBP resources.	Number of volunteer participants. Number of stranded horseshoe crabs rescued. Numbers of Turtle Exclusion Devices utilized in crab pots. Bycatch reduction.
Goal 5	**Develop and support partnerships that advance mutual interests and are aligned with CCMP goals.**				
DPEP 5.1	Provide scholarships, internships and other workforce development opportunities for high school and college students and graduates in the Coastal Bays watershed.	MCBP and Partners	Ongoing. Specific recruitment opportunities. Award scholarships to WCPS graduates. Hold annual WETLANDS retreat. Annual Youth Conservation Corps recruitment. Development of UMES Sarbanes Laboratory collaborative program.	$$ Within partner resources. Grant funding.	Number of career development workshops, scholarships, internships and employment opportunities provided. Special projects completed. Promote environmental education, work experience and stewardship.
DPEP 5.2	Implement Supplemental Environmental Projects (SEP's) resulting from a violation settlement, preferably in the same subwatershed.	MDE, MCBP, WC	Periodic as SEP opportunities arise.	$$-–$$$ SEP funding through violation enforcement and mitigation funds.	Number of projects accomplished in the Coastal Bays watershed.
DPEP 5.3 🔵	Respond and refer community concerns related to possible violations of environmental protections to the appropriate agency.	Berlin, MCBP, OC, OPA, WC	Ongoing as necessary. Updated agency contacts. Use of online OC Citizen Reporter tool.	$ Within partner resources.	Improved communication between regulators and watershed community. Reduced number of violations of environmental standards.
DPEP 5.4	Participate in local and regional teams and networks to communicate and collaborate on conservation and restoration activities in the watershed.	MCBP and Partners	Periodic meetings and collaborative workshops.	$ Within partner resources.	Better coordination of restoration actions among partner organizations. Team capacity building for funding and implementation of projects. Leveraging of resources.

Theme 4: Develop Public Engagement and Partnerships	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
DPEP 5.5	Participate in and share information at conferences, meetings, workshops, and technology transfer opportunities to receive and provide professional development.	MCBP	Ongoing. Periodic opportunities to attend conferences, meetings and workshops.	$ Within MCBP resources. Grant funding.	Professional staff development. Transfer of information and technology related to natural resource management. Recognition of MCBP research.
DPEP 5.6 🔵	Seek partnerships that support activities generating revenue for MCBP and others, while advancing programmatic and organizational community interests.	ASIS, Assateague State Park, MCBP, Partners	Ongoing. Specific events for development opportunities. Annual appeal campaign.	$ Within partner resources.	Revenue and program development from Assateague Outfitters. Number of funding opportunities with watershed partners. Funds generated outside of Section 320 funds. $100,000 annually from non-EPA and other grant sources.
DPEP 5.7	Support agencies and organizations working toward mutual CCMP goals through financial partnerships including mini-grants, research grants, subawards and sponsoring memberships	MCBP	Ongoing. Periodic opportunities for MCBP support. Pass through funding opportunities.	$$–$$$ Within MCBP resources. Supplemental funding, Grants.	Number of small grants and funding opportunities for projects and research in the MCBP watershed. Strengthening partnerships with organizations and academic partners.
DPEP 5.8	Provide expertise and a voice for the watershed by participating on boards, advisory councils, planning committees and attending relevant meetings.	MCBP	Ongoing. Periodic attendance and participation at meetings.	$ Within MCBP resources.	Number of meetings attended where technical or policy information was shared. Improved relationships among relevant organizations and local agencies.
DPEP 5.9	Support organizations and programs working towards the preservation of the history and culture of the watershed and its communities.	Beach to Bay Heritage Area, MCBP	Ongoing. Public opportunities for historic and cultural preservation.	$ Within partner resources.	Protection of cultural and historic resources in the watershed. Collaborative partnerships formed to preserve and conserve these resources.

Theme 4: Develop Public Engagement and Partnerships	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
DPEP 5.10 🔵	Collaborate with partners and stakeholders to develop plans, projects and maintenance guidelines that provide access and recreational opportunities on publicly owned lands.	Berlin, DNR, MCBP, OC, OPA, WC	Ongoing. Specific plans developed for public land use.	$–$$ Within partner resources. Grant funding.	Improved management of publicly owned lands. Number of plans and projects completed on public lands. Improved access and use of public lands.
Goal 6	**Conduct outreach efforts to the public and policymakers to gain support and promote the Maryland Coastal Bays Program.**				
DPEP 6.1 🔵	Inform federal, state and local agencies along with NGO's about the purpose and benefits of the National Estuary Program and establish dialogue among them.	MCBP	Ongoing. Annual Policy Committee meeting. Meetings with agency leadership and personnel.	$ Within MCBP resources.	Number of social media posts, newsletters, event participation in National Estuary Week. Increased communication and advocacy related to the NEP and MCBP as a member.
DPEP 6.2 🔵	Identify resource management issues and engage elected and appointed officials as to the challenges, possible solutions and funding needs.	Berlin, MCBP, OC, OPA, WC	Ongoing. Policy Committee Meeting. Legislative visits. Meetings with public officials.	$ Within partner resources.	Number of legislative presentations, meetings and visits. Informed decision makers. Improved opportunities for funding.
DPEP 6.3	Attend and participate in outreach events and meetings in the community to spread knowledge of watershed stewardship and best management practices.	MCBP	Ongoing. Event based opportunities for outreach.	$ Within MCBP resources.	Number of meetings and events MCBP staff attends and participates in. Improved Coastal Bays information for watershed area attendees.
DPEP 6.4 🔵	Develop, implement and respond to opportunities to develop funding through public and private grants, to supplement core EPA funding in support of CCMP programs and activities.	MCBP	Ongoing. Periodic grant proposal submissions. Periodic update of Finance Strategy.	$ Within MCBP resources	Number of grant proposals submitted and amount of awards received.

Theme 4: Develop Public Engagement and Partnerships	Action	Responsible Partners	Timeframe and Key Milestones	Cost Range and Funding Source	Performance Measures
Goal 7	**Integrate Diversity, Equity, Inclusion, Justice and Accommodations (DEIJA) into MCBP organizational and programmatic policies and actions.**				
DPEP 7.1	Integrate DEIJA values into all internal organizational matters, including management, personnel, financial policies and activities.	MCBP	Ongoing. Review of DEIJA strategies during all management and planning activities.	$–$$ Within MCBP resources. Grants.	Improvement of delivery of MCBP resources to all watershed residents and those served by programs. Improved management recognition and implementation of core values of DEIJA.
DPEP 7.2	Implement the MCBP Equity Strategy through all appropriate programmatic efforts, including identifying and supporting the needs and interests of diverse, disadvantaged, overburdened, and underserved communities.	EPA, MCBP	Ongoing. Periodic outreach activities and implementation of projects reaching and benefitting target populations.	$–$$ Within partner resources. Grants.	Number of outreach events and encounters and numbers of people reached. Number of projects implemented reaching and benefitting target populations.
DPEP 7.3	Improve the accessibility of MCBP and partner information, services and resources to all audiences, including those with physical and mental disabilities.	MCBP and Partners	Ongoing. Periodic dissemination of accessibility information. Periodic enhancement of events and project site features to improve accessibility.	$$ Within partner resources. Grants.	Number of communications disseminated and events held with enhanced accessibility features. Number and cost of periodic program site enhancements to improve accessibility.

Supplemental Plans and Strategies

CCMP's are living documents as described by EPA and are a critical component of the NEP model of adaptive management. As such, the CCMP will contain the main body of program Goals and Actions for implementation in a successful annual workplan. In addition, there are accompanying Plans and Strategies that are more strategic in nature and identify specific elements of program application being performed by partners.

EPA has allowed for the development of these Plans and Strategies in an ancillary manner, and to be completed within three years of the final revised CCMP. MCBP has completed several of these items, with the remainder currently planned or under development. They are further described below and incorporated by reference if completed.[1]

Climate Action Plan

MCBP Climate Action Plan is a broad and significantly important Goal in the 2025 CCMP. Within the Theme 3, Create Resilient Communities and Ecosystems, Goal 3 states to implement and periodically update the MCBP Climate Action Plan. As it was developed, the Climate Action Plan is a two-stage process. There was an initial Climate Change Vulnerability Assessment (CCVA) and a subsequent Climate Change Adaptation Plan (CCAP).

Climate Change Vulnerability Assessment (CCVA)

In 2017, the Maryland Coastal Bays Program (MCBP) undertook the first five steps of EPA's "Being Prepared for Climate Change: A Workbook for Developing Risk-Based Adaptation Plans." This Climate Change Vulnerability Assessment was conducted to learn about and prepare for the ways climate change stressors might affect MCBP's ability to reach the fourteen goals of the 2015-2025 Comprehensive Conservation & Management Plan (CCMP). The outcome of this assessment is the identification and prioritization of 168 risks that could limit MCBP's ability to reach those goals. Chief among the priorities to address are the impacts climate change will have on the Water Quality goals and Fish and Wildlife goals of the CCMP.

The assessment is a risk-based approach designed specifically to consider risks and impacts to the CCMP, and not how climate change stressors affect the entire region or watershed. The framing question used in the process was, "what are reasonably foreseeable ways that climate stressors could keep your organization from achieving its goals?"

As the Water Quality and Fish and Wildlife goals in the 2015 CCMP have adapted, the basic tenets of those goals and actions are still represented in the revised 2025 CCMP. As such, the CCVA and subsequent CCAP are both still relevant and important for the long-term success of the program. The completed CCVA may be found on the MCBP website.

Climate Change Adaptation Plan (CCAP)

To follow up on and develop adaptation strategies for mitigating the possible climate stressors identified in the CCVA, the MCBP developed a Climate Change Adaptation Plan. When it was completed in 2023, the CCAP referenced the related Goals and Actions in the 2015 CCMP. In revising the 2015 Plan, the 2025 CCMP now has a table for relating adaptation actions and the climate change risks to be considered for mitigation, with CCMP actions that directly connect to those CCAP adaptation actions. This table may be found on page 88. These adaptation actions in the complete CCMP Themes, Goals and Actions table (pages 60–85) are identified by the symbol 🔵.

Monitoring Plan

EPA requires that a monitoring plan be developed to track and detect changes and/or improvements within the study area, and effectiveness of CCMP Actions. MCBP has begun the Monitoring Plan and intends to use the STAC as the coordinating group to review and identify the following required elements: a) objectives, b) data the NEP and partners are collecting for which parameters; c) the party/parties responsible for collecting the data; d) frequency of collecting and reporting the monitoring data; e) how the data are shared, reported, and used; f) data gaps; and g) additional funding needed for monitoring activities and filling data gaps.

The monitoring plan will also explain how monitoring has/will change because of new/modified actions and priorities, and any new environmental indicators. Monitoring should be tied to the State of the Bays report which has similar components.

Finance Strategy

A finance strategy will be developed to establish long-term financial sustainability to implement the CCMP through diverse resources and partners. The strategy will be a separate document in support of the CCMP. The strategy will include: a) priorities for funding; b) current funding and other support such as staff assignments, or in-kind partnering; c) short- and long-term resource needs; and d) proposed actions or strategies to maintain or garner new resources for CCMP implementation. The Finance strategy will also provide other funding sources in addition to federal, state, and local grant funds and appropriations.

[1]*Guidance for Plans and Strategies described in this section and other specific elements of the CCMP directly reflect the EPA National Estuary Program Comprehensive Conservation & Management Plan Revision and Update Guidelines dated 5-3-16.*

Habitat Protection/Restoration Strategy

This strategy will be developed to link habitat or ecosystem issues addressed in the CCMP, including those habitats and species prioritized for protection and or restoration efforts. Components of this strategy include: a) relevant habitat types and key species in the study area; b) goals and measurable objectives to address them; and c) actions that reflect a climate change vulnerability assessment. Metrics of habitat protection and restoration efforts by MCBP and partners are currently reported to EPA annually.

Communication/Outreach Strategy

The MCBP will be developing a strategy to ensure community involvement and ownership in CCMP implementation that will be a stand-alone document linked to the CCMP. This strategy will include: a) guiding principles, or goals and objectives; b) target audience(s); c) a narrative description of activities, including any tools to be used such as branding and messaging, behavior change campaigns, or social media; d) implementers for those activities; e) any key deliverables, and f) a budget and timeframe for implementing the activities.

MCBP has begun drafting a Communication, Education and Outreach Plan (CEOP) to be implemented and supported through the Citizen Advisory Committee (CAC). The CEOP will, when finalized, contain all the requirements of the communication/outreach strategy envisioned by EPA.

Diversity, Equity, Inclusion, Justice, and Accessibility (DEIJA) Plan.

This plan has been developed by MCBP and is supported by EPA. The plan is also represented by Goal 7 in the Develop Public Engagement and Partnerships Theme of the CCMP. A comprehensive Equity Strategy was developed and approved by EPA as part of the Bipartisan Infrastructure Law (BIL) funding in 2022. Many of the future CCMP actions will be implemented with a connection to this plan to ensure equity strategies are employed in all aspects of the MCBP program. The DEIJA Plan is available on the MCBP website.

Climate Change Adaptation Plan Table with CCMP Action References

Tier 1 Adaptation Plan			
Adaptation Actions	**High Risk(s) to be Mitigated**	**Medium/Low Risks that might be covered**	**CCMP tasks that relate to the adaptation action**
Enhanced monitoring of septic systems; strategic placement of septic systems; drain field retrofit policies and practices; outreach and education to septic users.	As a result of sea level rise, inland areas will experience higher water tables and septic system drain fields may become inundated.	Increasing storminess/coastal storm events may overwhelm septic tanks, drain fields, and municipal wastewater treatment plants.	PHW1.1
Better turf management; education & outreach to turf managers; irrigation; aeration of compacted soils.	Increasing drought increases the use of irrigation of turf which could lead to runoff from compacted dry soils.	Warmer summers result in increase in use and degradation of turf, which may require greater irrigation and fertilizer for turf.	PFWH 5.4
Better turf management; education & outreach to turf managers; limit sporting activities on turf during droughts; increase irrigation; alternate turf species to account for changes in temperature.	Increasing drought stresses cool season turf creating greater turf loss during active sport playing seasons which necessitate maximum nutrient inputs to maintain vigor in season and to perform repairs afterward.		PFWH 5.4
More BMPs/catchment devices to slow the flow/ capture water; better nutrient management; partners can advocate for climate resilient plantings and restoration practices that counter this problem .	Increasing drought may cause a decrease in nutrient uptake which creates more residual nutrients that become mobile in flashy storms.		PHW 3.3; PFWH 4.4; CRCE 1.1
Lower nutrient loads (and appropriate nutrient ratio); partners can advocate for practices that reduce the temperature of the water (reduce stormwater flow from impervious surfaces); partners can advocate for and find funding for practices that prevent cyanobacteria blooms.	Warmer water can cause an increase in cyanobacteria.		PFWH 3.3, 3.4
Wetland restoration; plan for wetland migration.	Loss of wetlands from sea level rise reduces the amount of nutrients removed via natural processes.		PHW 1.4, 3.3; PFWH 3.7, 3.9; CRCE 1.1, 1.2
More GI installation, target/ plan/identify areas without infrastructure to dedicate resources/outreach to.	Urban areas with inadequate stormwater infrastructure will flood more often from increased storminess and large volumes of untreated water will enter the bays.	As a result of warmer waters, tidal flooding may extend to new areas, leading to additional sources of pollution.	PHW 3.3; CRCE 2.1, 2.2, 2.5

Adaptation Actions	High Risk(s) to be Mitigated	Medium/Low Risks that might be covered	CCMP tasks that relate to the adaptation action
More resilient shorelines, raising/planning for resilient infrastructure; maintenance of infrastructure.	In coastal areas, tidal flooding plus sea level rise will exacerbate stormwater flooding (untreated volume higher).		PHW 3.3; CRCE 1.1, 1.2, 2.1 2.2, 2.5
More resilient shoreline to better protect wetlands; better land-based activities to control the amount of nutrient pollution impacting wetlands; wetland stabilization; allow room for wetland migration; identify/protect most vulnerable wetlands.	Loss of wetlands from sea level rise reduces the amount of nutrients removed via natural processes.		PHW 1.4; PFWH 3.7, 3.9; CRCE 1.1, 1.2
Better/more resilient nutrient and stormwater management BMPs equipped to handle high volume rain events; more stormwater management to capture for reuse; natural restoration of rivers that keep the meander of rivers to slow the flow; increasing size of stormwater ponds to hold more water.	Increasing storminess may cause flashy high volume rain events which may lead to increased nutrient and sediment loading, with BMPs unable to intercept or handle increased volumes.		PHW 1.4, 3.3; CRCE 1.1, 1.2, 2.1, 2.2, 2.5
Increase resources for monitoring as needed. Provide more education and outreach to get people to provide more funding.	Changes in aquatic communities from warmer winters may lead to the need for increased resources (i.e. more trawls requiring more staff & funds to quantify changes; more funds shift to seafood marketing programs).	Changes in aquatic communities from increasing drought may lead to the need for increased resources (i.e. more trawls requiring more staff & funds to quantify changes; more funds shift to seafood marketing programs).	PFWH 1.1, 3.4, 3.10; CRCE 5.1, 5.2; DPEP 1.1, 2.1, 2.12, 4.2, 5.6
Create management/ monitoring plans for invasive species. Provide more education and outreach to raise awareness. Promote creation of noxious weed/ invasive mgmt board.	Warmer winters could cause the spread of invasive species.	Warmer summers could cause a shift in fresh and saltwater species composition and prey, may result in physiological stress in species (Yellow FW1); Larger magnitude storms can wash fish into new and unfavorable areas.	PFWH 4.1; DPEP 1.1, 2.11
Adapt restoration projects as needed. ID drought resistant species and change makeup of plant palette.	Increasing drought may cause increased stress in vegetation and lower the success rate of existing restoration projects, resulting in needed adaptation.	Increased turbidity from erosion or re-suspension of sediments as a result of increased storminess will limit light to SAV. Large storms can physically rip up SAV beds or overwash may bury them, which could limit the success of conservation efforts.	PFWH 4.4; CRCE 1.2
Protect areas adjacent to wetlands to allow for landward migration; education and outreach.	Sea level rise could cause drowning of estuarine wetlands and SAV with no landward retreat option and limited restoration opportunities.	Property owners may harden the shoreline in response to increased erosion from increasing storminess.	PFWH 3.1, 3.7, 3.9; CRCE 1.2, 2.2, 6.2; DPEP 2.1

Adaptation Actions	High Risk(s) to be Mitigated	Medium/Low Risks that might be covered	CCMP tasks that relate to the adaptation action
Adapt plantings and crops to deal with the appropriate temperature and precipitation regimes.	Warmer summers may cause increased stress in vegetation and lower the success rate of existing restoration projects, resulting in needed adaptation.		PFWH 4.4; CRCE 1.2
Department of Agriculture will need to adapt to new pests and adapt treatments and plantings accordingly.	Warmer winters may cause an Increase in pests overwintering.		PHW 1.3, 1.5, DPEP 2.8
Adapt stream restoration projects for greater flows, and restrict point and non-point discharges.	Stream restoration projects designed for current conditions may not be able to handle higher flows and more pollutants from increasing storminess.		PHW 1.4, 3.2, 3.3; CRCE 1.2
Update/adapt BMP's to increased flows and events.	Stormwater BMP effectiveness is diminished with increasing storminess.		PHW 3.3; CRCE 2.5
Revise and adapt conservation plans to changes in landscapes.	Plans and tools related to conservation programs will need to be updated to be relevant to the changing landscape as a result of sea level rise.		PHW 1.5, 3.2; CRCE 2.5, 6.2
Adapt conservation planning to changes in sea level. (e.g. Assateague shoreline, portions, being managed for mvmt). Planning should recognize different land uses in different areas.	Tidal flooding from sea level rise may change the character of beaches, marshes and shoreline areas. Conservation planning will need to consider beach/marsh migration.		PFWH 3.7; CRCE 1.2, 2.2, 2.5
Regulate/enforce proper sediment/nutrient control structures in new and existing development. Do outreach and expand riparian buffers in these eroding regions. Target green infrastructure installations.	Heavy rain events will increase sediment and nutrient flows which could impact benthic organisms.	Increased turbidity and less light penetration in the water column can result from increasing storminess.	PHW 1.4, 3.1, 3.3; CRCE 2.2, 2.5, 6.4, 6.5
Land-based nutrient control measures.	Increased bacteria, HABs, and microalgae from warmer water will impact the ability to monitor and restore sea grass beds.		PFWH 3.1, 3.3
Cities and states should create and update storm management plans as needed. Better collaboration and early engagement or preparedness for storms.	Partner resources may be needed for storm related emergencies and may not be available for CCMP actions.		CRCE 1.3, 2.1, 2.4, 2.5, 6.5

Adaptation Actions	High Risk(s) to be Mitigated	Medium/Low Risks that might be covered	CCMP tasks that relate to the adaptation action
Encourage deeper inland forestland buffers/easements to allow for the landward migration of terrestrial habitat. Accept and encourage this where wetland migration and shallow water SAV-suitable areas are expected. Clear ghost forests; manage invasives; let marshes colonize inland wherever possible; might be opportunities to better protect maritime and coastal forest from SLR (buffers? Adaptive management?	Sea level rise may cause the loss of maritime and coastal forest and adjacent freshwater "seep" habitat and species. Potential die-offs of coastal forest from inundation and saltwater intrusion.		PFWH 3.1, 3.7, 4.1, 5.1, 5.2; CRCE 6.1, 6.2
Regulate/enforce proper storm management and sediment controls in new and existing developments. Add green infrastructure, living shoreline type of projects. Reconnect floodplains.	Upstream sediment deposition and stream channel erosion from increasing storminess could lead to a loss of habitat and species.		PHW 1.4, 3.1, 3.3; CRCE 2.2, 2.5, 6.4, 6.5
Adapt funding and planning to changing conditions. Leverage partner resources.	Monitoring, data collection, and planning will be impacted by changing conditions affecting trends and funding priorities as a result of all 7 climate stressors.		PFWH 1.1, 3.4, 3.10; CRCE 5.1, 5.2; DPEP 5.6
Educate decision-makers on risks, impacts and cost/benefit of action/inaction to inform prioritization and decisions (not limited to stressor of increased storminess).	Decision-makers will have other more urgent priorities that may take precedence over CCMP goals as a result of increased storminess.	Sea level rise may cause more expenditures in time, money, and man-power by local emergency responders; with less land zones for development as a result of sea level rise, available land value and pressure to change zoning for less conservation may increase.	CRCE 1.3, 1.5, 2.1, 2.5; DPEP 2.5, 5.3, 5.8, 6.1, 6.2
Educate the public regarding algal blooms--and any misconceptions about the impact on human health, working with life guards and others who have primary contact with visitors who are swimming or otherwise in contact with bay waters.	Impacts due to fish, crab, horseshoe crab mortality, algae outbreaks etc. from warmer waters would be noticeable in the tourist and recreation economy. Impacts to species health and habitat will influence commercial/recreational activities.		PFWH 3.3; DPEP 2.2, 2.3, 2.6, 6.3
Educate tourism industry and business community about sea level rise risks and mitigation/resilience strategies.	Sea level rise can cause impacts to resources and therefore will impact the economic benefits to local tourism and businesses.		DPEP 2.1, 2.5, 5.8

Adaptation Actions	High Risk(s) to be Mitigated	Medium/Low Risks that might be covered	CCMP tasks that relate to the adaptation action
Promote and diversify low impact tourism options in the watershed.	Sea level rise can cause impacts to resources and therefore will impact the economic benefits to local tourism and businesses.		CRCE 6.7; DPEP 2.6, 2.15, 5.10
Educate the business community about sea level rise risks and mitigation/ resilience strategies.	Risk mitigation in flood prone and Sea Level Rise (SLR) impact areas will result in costly improvements in infrastructure and building modifications. Structures may be lost with SLR (nowhere for tourists to stay/recreate).		DPEP 2.1, 2.5, 5.8
Promote investment in coastal shoreline and infrastructure resilience and continue to install nature based solutions for infrastructure protection.	Risk mitigation in flood prone and Sea Level Rise (SLR) impact areas will result in costly improvements in infrastructure and building modifications. Structures may be lost with SLR (nowhere for tourists to stay/recreate).		CRCE 1.2, 2.1, 2.2, 2.3, 2.5, DPEP 2.1, 6.2
Protect groundwater recharge areas.	Warmer summers could lead to an Increase in and longer duration of ag and turf irrigation which could lead to localized groundwater depletion.		PHW 2.2, 2.3, 2.4
Educate the public on alternatives to turf that require less water input; demonstrate these alternatives on public sites.	Warmer summers could lead to an Increase in and longer duration of ag and turf irrigation which could lead to localized groundwater depletion.		PFWH 4.4, 5.4; CRCE 6.4; DPEP 2.1, 2.3, 2.9, 2.13, 2.17
Update comprehensive plans to include sea level rise considerations.	Sea level rise can cause impacts to resources and therefore will impact the economic benefits to local tourism and businesses; Risk mitigation in flood prone and Sea Level Rise (SLR) impact areas will result in costly improvements in infrastructure and building modifications. Structures may be lost with SLR (nowhere for tourists to stay/recreate).	Increasing storminess can result in impacts to resources and therefore will impact the economic benefits to local tourism and businesses.	CRCE 2.1, 2.5; DPEP 6.2

Adaptation Actions	High Risk(s) to be Mitigated	Medium/Low Risks that might be covered	CCMP tasks that relate to the adaptation action
UME and WSCD will promote crop diversity and intensify water management, including irrigation scheduling, as a buffer against climate-related impacts to agriculture. (e.g., more frequent summer droughts, warmer summers, and increased winter precipitation).	Adaptation of agricultural practices will likely be necessary with increasing drought and farmers may need support to maintain a viable agriculture economy; transitioning of land from ag and forestry to other uses may become more attractive if they becomes less viable; Warmer summers could lead to an Increase in and longer duration of ag and turf irrigation which could lead to localized groundwater depletion.	Flooding at headwaters may impact residential and industrial areas and farms and forests as a result of sea level rise.	PFWH 5.5; CRCE 6.1; DPEP 2.9, 2.10
WC will consider adopting a local ordinance that disincentives building and rebuilding in floodplains.	Sea level rise can cause impacts to resources and therefore will impact the economic benefits to local tourism and businesses; Risk mitigation in flood prone and Sea Level Rise (SLR) impact areas will result in costly improvements in infrastructure and building modifications. Structures may be lost with SLR (nowhere for tourists to stay/recreate).	Tidal flooding from SLR may have an economic impact, which may be even greater if development is allowed in areas that will become more flood prone.	CRCE 2.1, 2.2, 2.5
WC, OC and OPA will review ongoing and existing sea level rise studies and consider making appropriate code changes to minimize property loss while maximizing public safety. If warranted, determine if code conditions exist to elevate buildings and other property.	Sea level rise can cause impacts to resources and therefore will impact the economic benefits to local tourism and businesses; Risk mitigation in flood prone and Sea Level Rise (SLR) impact areas will result in costly improvements in infrastructure and building modifications. Structures may be lost with SLR (nowhere for tourists to stay/recreate).	Tidal flooding from SLR may have an economic impact, which may be even greater if development is allowed in areas that will become more flood prone (Yellow CE1); Resource impacts may be greater with increasing recreational use as a result of warmer summers.	CRCE 2.1, 2.2, 2.5
MDA and WCSCD will promote drought resistant Ag practices such as use of drought resistant varieties of crops, changes in cropping pattern and calendar of planting and conserving soil moisture through appropriate tillage methods.	Adaptation of agricultural practices will likely be necessary with increasing drought and farmers may need support to maintain a viable agriculture economy; transitioning of land from ag and forestry to other uses may become more attractive if they becomes less viable.		PFWH 5.5; CRCE 6.1; DPEP 2.9, 2.10

Adaptation Actions	High Risk(s) to be Mitigated	Medium/Low Risks that might be covered	CCMP tasks that relate to the adaptation action
Work with USDA, MDA and extension office on educational outreach promoting better adapted crops for a changing climate.	Adaptation of agricultural practices will likely be necessary with increasing drought and farmers may need support to maintain a viable agriculture economy; transitioning of land from ag and forestry to other uses may become more attractive if they becomes less viable.		PFWH 5.5; CRCE 6.1; DPEP 2.9, 2.10
WC, OC, Berlin, SHA and MDP will encourage aesthetically pleasing & ecologically beneficial low impact developments, such as streetscapes, parking facilities, commercial architectural standards and walkable/bikeable access between residential and commercial areas.	Sea level rise can cause impacts to resources and therefore will impact the economic benefits to local tourism and businesses; Risk mitigation in flood prone and Sea Level Rise (SLR) impact areas will result in costly improvements in infrastructure and building modifications. Structures may be lost with SLR (nowhere for tourists to stay/recreate).		PFWH 4.4; CRCE 2.5, 6.4, 6.7
Continue to invest in beach replenishment and beneficial use of dredged material.	Sea level rise can cause impacts to resources and therefore will impact the economic benefits to local tourism and businesses.		CRCE 4.1, 4.2, 4.3, 4.4, 4.5
Promote investment in coastal shoreline and infrastructure resilience, including marsh migration and replenishment.	Sea level rise can cause impacts to resources and therefore will impact the economic benefits to local tourism and businesses.		PFWH 3.7; CRCE 1.2, 2.1, 2.2, 2.3, 2.5, DPEP 2.1, 6.2
Continue to minimize new building in floodplains. Zoning for development outside of floodplains.	Risk mitigation in flood prone and Sea Level Rise (SLR) impact areas will result in costly improvements in infrastructure and building modifications. Structures may be lost with SLR (nowhere for tourists to stay/recreate); Decision-makers will have other more urgent priorities that may take precedence over CCMP goals as a result of increased storminess.		CRCE 2.1, 2.2, 2.5
Discourage unnecessary water use and promote water conservation by homeowners and water-use intensive businesses and institutions (e.g., golf courses, schools with sports fields, etc.	Warmer summers could lead to an Increase in and longer duration of ag and turf irrigation which could lead to localized groundwater depletion.		DPEP 2.1, 2.3, 2.5, 2.9

Adaptation Actions	High Risk(s) to be Mitigated	Medium/Low Risks that might be covered	CCMP tasks that relate to the adaptation action
Ensure that a realistic Hazard Mitigation Plan is in place and implemented. Involve the public in the process.	Decision-makers will have other more urgent priorities that may take precedence over CCMP goals as a result of increased storminess.		CRCE 1.3, 2.1, 2.4
Complete Nuisance Flooding Plan mandated by the state.	Decision-makers will have other more urgent priorities that may take precedence over CCMP goals as a result of increased storminess.		CRCE 2.1, 2.5
Educate the public regarding property maintenance in a floodplain and preparation for a storm.	Risk mitigation in flood prone and Sea Level Rise (SLR) impact areas will result in costly improvements in infrastructure and building modifications. Structures may be lost with SLR (nowhere for tourists to stay/recreate).		DPEP 2.1, 2.2, 2.3
Purchase/conserve land to allow planned retreat to inland areas allowing wetlands to move as sea level rises.	Sea level rise may cause a dramatic loss of tidal wetland habitat, limiting the areas available for plant and animal species and recreational pursuits.		PFWH 3.7; CRCE 2.1, 2.2, 2.5
Create tax incentives for building away from the shorefront; develop natural hiking, birding, cycling areas inland.	Public shorefront property may be lost as a result of sea level rise and may not be replaced.		CRCE 2.1, 2.2, 6.7
Incorporate climate change considerations into zoning requirements; purchase land to allow for inland migration of wetlands.	Sea level rise may cause damage to or loss of wetland, island, and shoreline creation projects.		PFWH 3.7; CRCE 2.1, 2.2, 2.5
Accept current plan, or mitigate by creating a regional sediment management plan.	Based on changing conditions from sea level rise, creation and updating of the Coastal Bays Navigation and Sediment Mgmt plan may be more complicated, incurring more costs over time.		CRCE 4.1, 4.2, 4.3, 4.4, 4.5, 4.6

Tier 2 Water Quality Adaptation Plan			
Adaptation Actions	**Red Risk(s) to be Mitigated**	**Yellow/Green Risks that might be covered**	**CCMP tasks that relate to the adaptation action (◊)**
Better collaboration, early planning, more communication, education and outreach; better resiliency planning; plan for resource diversion; better resource planning.	Resources from partners may be needed to deal with emergencies and may not be available for TMDL or CCMP actions as a result of warmer waters.		CRCE 1.1, 1.3, 2.1; DPEP 6.1, 6.2, 6.4
Buffers and erosion control measures to trap eroding materials; Sand fences and other screen devices along coasts.	Increasing drought could increase wind erosion on well drained sandy soils.		CRCE 1.1, 1.2
Education and outreach to facility managers, repair/remove known at-risk or abandoned structures;education and outreach about household hazardous waste; increase number of hazardous waste disposal days.	Increasing storminess could cause contaminated fluids and debris from storm damaged structures/facilities/ vehicles to wash into the bays.	Heavy rain induced flooding from increasing storminess may inundate storage buildings causing releases of toxic product; SLR-induced incursion onto upland could flood toxic containment sites; Increase in heavy rainfall events from increasing storminess could cause more rapid leaching of toxic contaminants-such as from landfills and wastewater systems (septic and spray); sewage overflows from sea level rise may lead to more toxic contaminants	CRCE 1.3, 2.4; 6.3; DPEP 2.1, 2.3, 2.16
Begin discussions with the community about ways to restrict development to areas and corridors (e.g. zoning); increase education and outreach.	As urban areas are impacted by sea level rise, human relocation will encroach upon natural areas.	Increasing drought will make public acceptance of the need for conservation efforts of small waterbodies and perennial streams more difficult because there is so little left to protect	CRCE 2.1, 2.2, 2.5, 6.2; DPEP 2.1,
Create new coastal impoundments as needed. All lakes in Maryland are manmade. Create more resilient shorelines. Model to determine best locations for impoundments.	Sea level rise could result in a potential loss of coastal impoundments.		CRCE 1.2
Plan/protect/create beach spawning areas adjacent to shorelines to allow for landward migration of sea level. ID areas to protect/ move hardened shorelines.	Sea level rise will reduce the area for horseshoe crab spawning.		PFWH 2.4, 3.2; CRCE 1.2; DPEP 4.2, 4.4

Adaptation Actions	Red Risk(s) to be Mitigated	Yellow/Green Risks that might be covered	CCMP tasks that relate to the adaptation action (◊)
Control the release and discharge of point and non-point pollutants. May require increased health assessments for consumable shellfish. Consideration should be given to food chain bioaccumulation of toxins.	Increasing drought may cause higher concentrations of pollutant loads.		PHW 1.1, 1.9, 3.1, 3.2, 3.3; PFWH 2.7, 2.8, 3.3
Identify a plan for a managed retreat--inland open space for future beach tourism.	Sea level rise can cause impacts to resources and therefore will impact the economic benefits to local tourism and businesses; Risk mitigation in flood prone and Sea Level Rise (SLR) impact areas will result in costly improvements in infrastructure and building modifications. Structures may be lost with SLR (nowhere for tourists to stay/recreate).		CRCE 2.2, 2.5, 6.2
MDA and others will increase investment in improved monitoring and forecasting tools to increase farmers' ability to prevent, rather than react to, adverse impacts.	Adaptation of agricultural practices will likely be necessary with increasing drought and farmers may need support to maintain a viable agriculture economy; transitioning of land from ag and forestry to other uses may become more attractive if they becomes less viable.		PFWH 1.1, 3.7, 3.10, CRCE 2.2, 6.1, 6.2
Work with USDA and extension office on strategies for improved energy efficiency of poultry houses and better disease monitoring.	Adaptation of agricultural practices will likely be necessary with increasing drought and farmers may need support to maintain a viable agriculture economy; transitioning of land from ag and forestry to other uses may become more attractive if they becomes less viable.		CRCE 6.1, 6.6
Support experimental or demonstration farm or practices that other farmers can visit/observe and learn from.	Adaptation of agricultural practices will likely be necessary with increasing drought and farmers may need support to maintain a viable agriculture economy; transitioning of land from ag and forestry to other uses may become more attractive if they becomes less viable.		CRCE 6.1, DPEP 2.3, 2.10

Adaptation Actions	Red Risk(s) to be Mitigated	Yellow/Green Risks that might be covered	CCMP tasks that relate to the adaptation action (◊)
Work with USDA and extension office, health dept and local economic development efforts to expand promotion of supporting local food production. Give farmers options beyond the current undiversified market.	Adaptation of agricultural practices will likely be necessary with increasing drought and farmers may need support to maintain a viable agriculture economy; transitioning of land from ag and forestry to other uses may become more attractive if they becomes less viable.		CRCE 6.1, DPEP 2.5, 2.10
Implement recreational usage limits.	Beach erosion on Assateague Island as a result of increasing storminess will increase the competition between recreational use and habitat protection, particularly in the OSV zone, because of less available beach area.	May become more difficult to prevent people from utilizing coastal bay habitat restoration islands and increase boat use, impacting colonial nesting birds.	CRCE 2.2, 6.5; DPEP 2.6
Partners could apply for grants to re-mark shoals.	Movement of shoals as a result of increasing storminess may increase expenses.		CRCE 4.6
Replenish with dredge spoils; plant vegetation to minimize shoreline loss.	Increasing storminess negatively impacts existing and restored islands and shorelines, increasing the costs for continued maintenance and restoration.	Increased storminess may make it more difficult to move or pump sand due to lack of calm days.	CRCE 1.2, 4.4

Acronyms

BMP – Best Management Practice

BRF – Bay Restoration Fund

CAC – Citizens Advisory Committee

DAG – Dredging Advisory Group

FSP – Forest Stewardship Plan

IC – Implementation Committee

MAEOE – Maryland Association of Environmental and Outdoor Education

TMDL – Total Maximum Daily Load

NGO – Non-Governmental Organization

NMP – Nutrient Management Plan

OCWRS – Ocean City Water Resources Study

PC – Policy Committee

PDA – Public Ditch Association

PFAS – Per- and Polyfluoroalkyl Substances

SEPs – Supplemental Environmental Projects

SETs – Surface Elevation Tables

SLR – Sea Level Rise

SMP – Sediment Management Plan

STAC – Science and Technical Advisory Committee

TIPP – TMDL Implementation, Planning and Progress Tool

WETLANDS – Worcester Environmental Training, Leadership, and Stewardship Retreat