



Maryland Port Administration
**Dredged Material
Management Program**

Annual Report 2023

BUILDING THE FUTURE TOGETHER

Table of Contents

2023 Annual Report Overview 3

Progress in 2023: Building the Future Together 4

 MPA’s Mission 5

Funding and Policy 7

 Investing for Efficiency and Competitive Excellence 7

 Investing in Expansion 8

Planning and Operations 10

 Planning for Flexibility and Resilience 10

 Dredged Material Placement Sites 14

Outreach and Education 23

 Investing in Equity and Opportunity 23

Our Vision for 2024 27

Glossary of Acronyms 29



DREDGED
MATERIAL
MANAGEMENT
PROGRAM

2023 ANNUAL REPORT OVERVIEW

» Milestones in Construction and Planning

- Cox Creek Dredged Material Containment Facility: Construction of the expansion and dike raising to +60 ft was completed ahead of schedule, providing a major boost in MPA's ability to meet its 20-year planning mandate.
- Masonville Dredged Material Containment Facility: Base dike widening was completed in early 2023, allowing for dike raising to +30 ft to begin.
- Seagirt Marine Terminal: The Modification of the Seagirt Loop Channel Feasibility Study assessing options to relieve a berth capacity bottleneck and enable more efficient vessel movement was completed ahead of schedule and under budget.
- Mid-Bay Islands:
 - Barren Island: Significant progress was made on Barren Island Phase I construction, including installation of protective stone sills and breakwaters lining the island's western side.
 - James Island: Design work is progressing with input by multiple state and federal agencies. Maryland Port Administration is working in close collaboration with the US Army Corps of Engineers on National Environmental Policy Act implementation.

» Creative Partnerships with Sister Agencies

- Maryland Port Administration and Maryland Department of Natural Resources are identifying opportunities for collaboration on coastal resiliency, including potentially incorporating Innovative Reuse and Beneficial Use of dredged material into resiliency projects statewide.
- With a goal of incorporating nature-based solutions into the James Island design, Maryland Port Administration and the US Army Corps of Engineers are conducting workshops to gather feedback and ideas from state resource and regulatory agencies.

» Innovations to Increase Capacity

- Maryland Port Administration is working with the Maryland Department of Environment to develop remedial action plans for the site adjacent to the Cox Creek Dredged Material Containment Facility, now known as the Cox Creek Sediment Technology and Reuse (STAR) Facility. The goal is to continue site remediation and prepare for Innovative Reuse activities as sections of the property are remediated.

- A major milestone was achieved in 2023 with the signing of Senate Bill 782, which requires Maryland's Green Purchasing Committee to establish specifications for purchasing recycled materials and products, including dredged material. This is a significant step toward the approval of dredged material as a qualified sustainable or recycled material.

» Creating Community Benefits

- The final design for the Swan Creek Nature Trail, a community enhancement recommended by the Cox Creek Citizens Oversight Committee, is nearing completion, and construction is planned to start next summer. The goal is to open the trail to the public by 2025.
- The initial 30% design process is underway for the Masonville Cove Connector, a shared use path providing safe and equitable access to Masonville Cove.

» Equitable Engagement

- Port outreach programs continue to prioritize environmental justice, diverse representation reflecting the communities the Maryland Port Administration serves, and increasing public knowledge about the Port of Baltimore for outcomes that equitably benefit all Marylanders.
- Education and outreach efforts resulted in nearly 20,000 engagements at 372 events.

» Career Connections

- With support from the Maryland Port Administration, the Baltimore Port Alliance hosted its fifth and largest Hiring & Career Expo, bringing together 38 employers and nearly 250 job seekers.
- Together with partners, the Maryland Port Administration hosted the Masonville Cove WildSTEM Summer Internship, a comprehensive program enabling four interns from local Historically Black Colleges and Universities to explore conservation careers. Interns gained practical experience and were exposed to leadership opportunities and conservation career pathways.

► Progress in 2023: Building the Future Together

We are pleased to report that Maryland Port Administration's (MPA) Office of Harbor Development, working closely with partner organizations, has provided innovative solutions to a range of challenges in 2023. This year, guided by the Dredged Material Management Program (DMMP), MPA invested in infrastructure, equipment, and processes that will provide long-term economic and ecological benefits. It innovated and implemented important capacity-building projects and enhanced effective working relationships with the private sector, federal government, sister state agencies, and diverse stakeholder communities.

The DMMP plays an essential role in supporting the Port of Baltimore (the Port) and MPA's mission as an economic and ecological leader in Maryland and the Chesapeake Bay region. MPA is responsible for finding adequate long-term placement capacity for all of the nearly five million cubic yards of sediment that the US Army Corps of Engineers dredges annually from the shipping channels that link the Port to the Atlantic Ocean and beyond. This dredging to maintain the shipping channels current depths and widths makes it possible for some of the largest cargo ships in the world to reach the Port of Baltimore. By maintaining the Port's infrastructure, including its 50-foot-deep shipping channels, and upholding its commitment to stakeholder engagement and science-informed decision making, MPA generates outcomes that equitably benefit Marylanders.

MPA works on a rolling 20-year plan that outlines the projected dredging demands, describes the need to regularly remove sediment from the Port's shipping channels, and identifies adequate placement capacity and alternative management solutions for dredged material. The program effectively leveraged the substantial investments made in recent years. Multi-year planning efforts have neared or reached completion and are progressing towards implementation, which lays the foundation for continued success in 2024.

This annual report from the DMMP Management Committee to the DMMP Executive Committee:

- Places the year's work in the context of advancing MPA's mission by providing an overview of the Port's importance to Maryland and the nation and the pivotal role of long-term dredged material management plans
- Summarizes the year's significant accomplishments toward the 2023 DMMP Recommendations and highlights the partnerships with stakeholders that are essential to mutually beneficial outcomes and success
- Provides recommendations for continuing to build upon the DMMP's excellence in 2024

This publicly available report provides a cross-cutting guide to DMMP activities and future plans for the DMMP Executive Committee, program managers, elected officials representing Marylanders at the local, state, and national levels, and state and federal agency staff. MPA is working every day to provide and plan for adequate dredged material management options for 20 years and beyond, facilitating Maryland's economic growth, prosperity, and sustainability.

» MPA's Mission

MPA is committed to integrating its statutory mission to increase waterborne commerce through Maryland with forward-looking stewardship of the state's natural resources, including the health and resilience of the Chesapeake Bay watershed, and support for Maryland's people and communities. The 130+ mile navigational channel system that serves Maryland's ports remains viable through significant maintenance dredging and management of that dredged material, which is a fundamental responsibility of the Office of Harbor Development, executed through the work of the DMMP. Dredging makes it possible for some of the largest cargo vessels in the world to do business in Baltimore and drives economic prosperity for the State of Maryland. Working collaboratively with stakeholders, the DMMP identifies innovative, cost-effective, and environmentally responsible long-term placement and capacity solutions, from beneficial use of dredged material to expansion of existing facilities. The collaborative input from DMMP committees is documented each year in the DMMP Annual Report in the form of recommendations that guide the focus of efforts for the MPA in three categories: Funding and Policy, Planning and Operations, and Outreach and Education. This annual report provides progress updates on achievements towards those recommendations. For more than 20 years, the DMMP has improved and maintained the navigation channels that serve the Port while promoting environmental stewardship that benefits the Bay and outcomes that provide economic, environmental, and social benefits for the State of Maryland.

PORT OF BALTIMORE ECONOMIC IMPACT IN MARYLAND



15,330 DIRECT JOBS



21,970 INDUCED AND INDIRECT JOBS



101,880 RELATED JOBS TO PORT'S CARGO

**TOTAL:
139,180
JOBS**

\$395 MILLION IN MARYLAND STATE AND LOCAL TAX REVENUES

\$2.6 BILLION IN MARYLAND BUSINESS REVENUES

\$3.3 BILLION IN PERSONAL INCOME TO MARYLANDERS

Source: Martin Associates (2018) THE 2017 ECONOMIC IMPACT OF THE PORT OF BALTIMORE IN MARYLAND



50' CHANNEL SYSTEM	
35' CHANNEL SYSTEM	
	ACTIVE PLACEMENT SITES
	PLANNED PLACEMENT SITES
	INACTIVE PLACEMENT SITES

To carry out its mission, the DMMP has formed long-lasting partnerships across the spectrum of Marylanders concerned about the important economic and ecological resources the program maintains, restores, and protects. DMMP planning and implementation processes involve elected officials and government agencies at every level, from the Maryland Congressional delegation to neighborhood associations. Its activities incorporate inputs from a wide range of industries -- a sample includes the logistics and transportation sector; watermen and associated businesses; and anglers, boaters, and other outdoor recreational interests. It works with academic researchers assessing environmental outcomes and with entrepreneurs developing novel uses for dredged material, such as shoreline stabilization and wetland restoration. It engages with conservation organizations and local residents to ensure that DMMP projects mitigate their environmental impacts in ways that achieve benefits for the Chesapeake Bay region's wildlife, fisheries, and communities. Of special importance, the DMMP is committed to environmental justice, inclusivity, transparency, educating Marylanders, especially youth, about environmental stewardship, and to helping young people from all backgrounds prepare for potential careers in the maritime and science, technology, engineering, and math (STEM) industries.

► **Funding and Policy**

Investing for Efficiency and Competitive Excellence

Ensuring adequate funding for MPA projects that benefit the Port and waterborne transit nationwide will always remain a priority. MPA participates in the American Association of Port Authorities (AAPA) Quality Partnership Initiative, a partnership between AAPA and the United States Army Corps of Engineers (USACE) to promote strategic and operational efficiencies and improvements in the nation's maritime waterways transportation system. MPA is part of the Harbors and Navigation Subcommittee, working on how to better coordinate with USACE to keep channels maintained. MPA worked closely with AAPA members to draft language in Congress' 2022 reauthorization of the Water Resources Development Act (WRDA) to the benefit of all ports and is looking ahead to address future needs in WRDA 2024.

2023 USACE WORK PLAN BUDGET BREAKDOWN

The USACE budget for Federal Fiscal Year (FFY) 2023 includes federal appropriations for annual channel dredging. In FFY2023, the USACE Work Plan included \$30.59M in operations and maintenance for the Baltimore Harbor and Channels (including \$5.54M in Energy Transfer Port funding), \$31.11M in operations and maintenance for the Chesapeake & Delaware Canal, and \$21.34M in construction for Poplar Island. Also included is \$3.22M in operations and maintenance funding to dredge the Honga River and Tar Bay in Dorchester County, MD, which will improve access for watermen and provide needed sediment for restoration activities at Barren Island.

\$31.11M	Operations & Maintenance for the Chesapeake & Delaware Canal
.....	
\$30.59M	Operations & Maintenance for the Baltimore Harbor and Channels
.....	
\$21.34M	Construction for Poplar Island
.....	
\$3.22M	Operations & Maintenance to dredge the Honga River and Tar Bay



» Investing in Expansion

Seagirt Marine Terminal: Modification of the Seagirt Loop Channel Feasibility Study

Currently, ships calling on the Seagirt Marine Terminal must back out of the terminal using the Dundalk-Seagirt Access Channels, causing delays and creating unnecessary risks. In coordination with MPA, USACE recently undertook the Modification of the Seagirt Loop Channel feasibility study, a 3-year study to assess options to relieve the terminal's bottleneck and enable more efficient vessel movement. The feasibility study has been completed ahead of schedule and under budget, demonstrating a favorable benefit to cost ratio and recommending widening and deepening the West Seagirt Branch Channel to -50ft. These improvements will provide safer and more efficient navigation at the Port and help meet the demand for future capacity at Port facilities, including increased container volume expected from increased calls, anticipated increases in ultra-large container vessels, and increased efficiency related to the Howard Street Tunnel project. The channel deepening and widening project will advance to the Preconstruction, Engineering, and Design (PED) phase once a design agreement is executed with USACE. The PED phase will generate a design, project schedule, and estimated construction costs. The two-year PED process is anticipated to begin in 2024. The estimated cost share for PED is \$2.42M in federal funds, with \$807,000 from the State of Maryland.

MPA is working with the Maryland Congressional delegation to secure construction authorization for the Seagirt Loop Deepening Project in WRDA 2024, recommending that Congress fund approximately \$64 million to deepen and widen MPA's West Seagirt Branch Channel (the loop) to -50 ft, with an average width of 760 ft and additional widening at bends for navigation safety, as recommended in the Feasibility Study. Additionally, the MPA is seeking authorization in WRDA 2024 for the USACE to assume responsibility for the operations and maintenance of improvements made to the Seagirt Loop channel by the State of Maryland in 2013 and 2021. Timely completion of these necessary improvements ensured the Port could handle the largest container vessels calling at East Coast ports at that time. While the State initiated these improvements, it is appropriate for USACE to assume the long-term maintenance.

Howard Street Tunnel Expansion

Ground was broken on the long-awaited Howard Street Tunnel expansion project in November 2022, part of a series of double-stack clearance improvements at 22 rail locations between Baltimore and Philadelphia. The reconstruction of the 127-year-old, CSX-owned freight rail tunnel will permit double-stacked intermodal container trains to move in and out of the Port. Collectively, the series of improvements will alleviate the last remaining transportation bottlenecks on the East Coast and create the shortest distance high-capacity rail conduit from the Mid-Atlantic to the upper Midwest. The Howard Street Tunnel work and other Maryland portions of the initiative are in design phases, with contractors hired. Construction will begin when designs are approved and is expected to be completed in 2026.

The combination of the tunnel expansion and the Seagirt Loop Channel modifications will improve supply chain efficiency and reduce highway congestion for communities, which will deliver environmental benefits from increased use of rail.

Goal: A Cleaner, Greener Neighborhood

MPA has a unique opportunity to leverage its ongoing efforts in carbon reduction programs and environmental initiatives with additional opportunities to meet environmental justice, equity, and diversity standards. MPA is working in partnership with Ports America Chesapeake (PAC) at the Seagirt Marine Terminal to increase electrified equipment to reduce emissions. Four supersized container cranes were installed last year and are now fully operational. The cranes can efficiently service the larger ships calling on the Port of Baltimore and are part of a \$166M investment made by PAC at the Seagirt Marine Terminal, serving the new second deep-water berth. These larger cranes are fully electric and thus emit no diesel emissions. The cranes are part of a significant expansion to provide greater capacity and efficiency for anticipated increases in container volumes. PAC also continued with new electrification initiatives in 2023.

Collaborating on Coastal Resiliency

MPA works with local, state, and federal partners to research, plan for, and implement sound climate resilience and adaptation policies and projects. The beneficial use of dredged material is an important tool, with projects providing sediment to build more resilient shorelines and adding elevation capital to habitats while also solving capacity constraints at Dredged Material Containment Facilities (DMCFs). In February, MPA and the Department of Natural Resources (DNR) met to identify opportunities for collaboration on coastal resiliency, including the potential for incorporating Innovative Reuse and Beneficial Use (IRBU) of dredged material into projects throughout the state. The meeting included a demonstration of the use of Innovative Reuse (IR) research and development shoreline restoration products.

INNOVATIVE REUSE

The use of dredged material in the development or manufacturing of commercial, industrial, horticultural, agricultural, or other products and includes upland uses of dredged material.

BENEFICIAL USE

The use of dredged material for the restoration of underwater grasses, island restoration, stabilization of eroding shorelines, the creation or restoration of wetlands, and the creation, restoration, or enhancement of fish or shellfish habitats.

MPA and the University of Maryland received a Federal Highway Administration Climate Challenge grant to study constructing vegetative infiltration berms for flood protection from Baltimore Harbor dredged material and dredged material blends. This will involve creating and testing dredged material blends, with three specific criteria defining a successful blend: (1) appropriate geotechnical properties, (2) acceptable environmental properties, and (3) the ability to rapidly establish vegetation in a berm setting. Blending materials that are under consideration include lime, recycled concrete aggregate, gypsum, and wheat straw. An optimized blend that best meets all criteria will be thoroughly tested. The outcomes of this research include a life cycle analysis and environmental product declaration.

Senate Bill 782 was signed by the Governor in April and requires the Maryland Green Purchasing Committee to establish specifications for purchasing recycled materials and products. Dredged material was specifically named in the bill, and MPA is working to have dredged material officially listed as a qualified sustainable or recycled material.

► Planning & Operations

Planning for Flexibility and Resilience

MPA manages the 20-year dredging demand and placement capacity supply for all channels serving the Port of Baltimore. To support this effort, MPA has developed a comprehensive and formal procedure, referred to as long-range capacity planning, to project dredging needs, the available capacities of placement sites serving those channels, and alternative measures to extend the life of existing placement sites. This assists MPA in determining the necessary timing for new dredged material management options to be brought online.

The DMMP continues to invest in strategic capacity recovery and long-range capacity planning. These forward-looking activities facilitate the Port's mission by promoting consolidation, removing material from placement sites, or diverting material from those sites. Planning also builds in flexibility, allowing for the possibility of changes to dredging inflow demands, which may result from potential development of marine terminals. Planning addresses external challenges such as the effects of climate change and sea-level rise on dredging and placement capacity, permitting delays or difficulties, and procedural requirements. By Maryland statute the Baltimore Harbor is defined as all waters north and west of the North Point-Rock Point line. Sediment dredged from Baltimore Harbor is currently placed in facilities owned by MPA, including the Cox Creek and Masonville DMCFs.

20-YEAR DREDGING AND PLACEMENT PROJECTIONS IN MILLION CUBIC YARDS (MCY) (based on information available as of June 2023)		
Channel Segments	Dredging Needed	Remaining Placement Capacity
Baltimore Harbor Channels	23.3 mcy	25.2 to 30.5* mcy (with completion of Cox Creek Expanded, IRBU, and Masonville)
Maryland Chesapeake Bay Approach Channels	40.3 mcy	119.2 mcy (Poplar Island and Mid-Bay)
Virginia Chesapeake Bay Approach Channels	17.2 mcy	1,422 mcy
C&D Canal and Approach Channels	12 mcy	15.6 mcy (Pearce Creek with dike raising)

**Baltimore Harbor Channels' remaining placement capacity is presented as a range in this year's report due to variables associated with the in-development IRBU programs and the construction methodology of raising the Cox Creek DMCF perimeter dike to +80 ft Mean Lower Low Water (MLLW).*

While current overall capacity has the potential to accommodate the next 20 years of dredging needs, there are near-term pinch points in the current plan for material dredged from the Baltimore Harbor channel segments, resulting in an ongoing exclusion of dredging inflows from private sector new work. Through FFY 2027, MPA can accommodate all anticipated USACE maintenance inflow, as well as planned maintenance dredging projects for the private sector and the Seagirt Loop. MPA continues to work diligently to keep DMCF expansion projects on track, recover capacity, and pursue innovative alternative dredged material management solutions.

These estimates show that IRBU will become instrumental in maximizing placement site capacity to ensure MPA can accommodate projected channel dredging needs during the 20-year planning period. Studies of methods to regain capacity at the DMCFs show promise, although they require additional development, including regulatory coordination, before real capacity gains can be realized. MPA must continue the planning process and accelerate material recovery schedules to have sufficient dredged material management capacity beyond 2043. To maximize capacity, facilities must be carefully managed, adhere to project construction schedules, and

incorporate capacity recovery and dewatering strategies.

MPA is pursuing a permit renewal for harbor-wide dredging to cover all MPA maintained access channels and berths in the Baltimore Harbor region, including North Locust Point, South Locust Point, Seagirt, Seagirt Loop modifications, Dundalk, Colgate Creek, Hawkins Point, Fairfield/Masonville and Cox Creek. This six-year permit would be a proactive measure to ensure that MPA can execute harbor dredging as needed to maintain channel and berth depths

Innovation's Bright Future at the STAR Facility

In 2022, MPA acquired the property adjacent to Cox Creek DMCF to serve as a hub for advancing the innovative reuse program and implementing large scale capacity recovery efforts. Remediation planning began in 2023 for the site, now named the Cox Creek Sediment Technology and Reuse (STAR) Facility.

The near-term goal is to ramp up capacity recovery and innovative reuse while the property is being remediated, including dewatering and stockpiling of material. Remediation on a portion of the property is expected to be completed in 2025. MPA is currently developing a master plan for full site development and is exploring a contract vehicle to prepare for eventually housing IR tenant partners at the Cox Creek STAR Facility. Possible tenants have begun to tour the facility and engage in ongoing conversations with MPA regarding possibilities. Once it is fully operational, MPA hopes to reclaim a minimum of 500,000 cubic yards of dredged material from the Cox Creek DMCF annually for IR.

Capacity Recovery

In recent years, the DMMP, working in partnership with universities, private industry, scientists, agencies, communities, and entrepreneurs, has developed a variety of IRBU concepts and pilots to test new uses on a small scale. Initial results are encouraging and MPA will continue to look for additional opportunities to expand these concepts or pursue new avenues for IRBU. Examples of active projects include:

- MPA has re-engaged with Baltimore City to develop an ongoing agreement to use dredged material as alternative daily cover at landfills, with a focus on the Quarantine Road Landfill located in Curtis Bay, because of its size and proximity to the Cox Creek DMCF. MPA is working in close partnership with the City regarding material sampling and other logistics. Material for the alternative daily cover will be recovered from Cox Creek DMCF and dried prior to placement.
- The planning phase is underway for two small-scale Beneficial Use (BU) projects in the Patapsco watershed for shoreline restoration at Stoney Beach and for Baltimore City for capping material at the Race Street Honeywell site. In total, approximately 2,000 cy of dredged material will be used for these projects.
- [MPA's IRBU Web Tool](#) allows those seeking to access dredged material for projects to initiate a request with MPA.
- Colgate Creek, between Seagirt and Dundalk Marine Terminals, is being dredged to maintain safe navigation. In 2024-25, approximately 200,000 cy of dredged material from this effort will be placed in geotubes for drying and transport rather than into a DMCF. MPA is evaluating staging sites for geotubes and eventual reuse projects, with the goal that this process can be utilized again throughout the region to facilitate the innovative reuse of dredged material.

Once completed, the Mid-Chesapeake Bay Island Ecosystem Restoration Project will accommodate an estimated 90 - 95 mcy of dredged sediment, providing more than 30 years of placement capacity for Bay channel material.

Contingencies and Timing

Methods to recover capacity at the DMCFs show promise. Some of these methods will require additional development, including regulatory coordination and stakeholder outreach before real gains can be realized. Recognizing that new technologies are the linchpins to the Port's capacity growing well beyond the current 20-year planning cycle, MPA is committed to pushing forward with innovation that delivers long-term economic and ecological benefits to Maryland businesses and communities.

Timing of dredging needs and capacity expansion at DMCFs is carefully choreographed, and major issues could occur if funding is not available when it is needed. It is critical that funding come through in a timely manner.

IMPACT SPOTLIGHT:

Building Bird Habitat



A 9-year-old participant in MPA's 2023 Youth Birding Camp peered through binoculars at Swan Creek, marveling at the wildlife that lives so close to their own urban home. Swan Creek Wetland, a mitigation site adjacent to the Cox Creek DMCF, hosts 183 bird species and is just one spot that MPA's campers have the chance to enjoy. In total, MPA has created or restored 1,088 acres of wetlands and wildlife habitat since 2000. MPA has also converted historically contaminated and industrial sites to hotspots for local wildlife and provided public access, reconnecting communities to the waterfront. Future restoration of Mid-Bay Island, new cells at Poplar Island, and the Hart-Miller Island North Cell offer the possibility of an estimated additional 2,000 acres of wildlife habitat. This is a boon for the animals who have found refuge in a green oasis within Baltimore City or remote Chesapeake Bay island habitat, and it provides unique opportunities for Marylanders to learn and engage with the natural world.

Across all of MPA's DMMP sites, 332 species of birds have been identified, with 22 rare nesting species and one-of-a-kind sightings like Snowy Plover, Sharp-tailed Sandpiper, and Slaty-backed Gull. Public tours and birding events have allowed 741 people to enjoy this wildlife. Special engagements like the 2023 bird banding at Masonville Cove resulted in documenting 571 birds of 53 species, adding to scientific knowledge of this important habitat. The 11 students who participated in the Youth Birding Camp perhaps had the most immersive and transformative experience of all. With a newfound connection to nature and an understanding of where to see birds at local MPA sites, these young people can serve as advocates, ambassadors, and bird lovers for years to come, thanks to the beneficial use of dredged material and the habitat that MPA has created.

INNOVATIVE REUSE IN ACTION: Research and Development Projects

The robust pipeline of research and development projects was a key factor in defining the need for the Cox Creek STAR Facility adjacent to the Cox Creek DMCF. Current research projects include:

Product and Company	Results	Current Status / Future Considerations
<p>Ceramic bricks and permeable pavers</p> <p>Belden-Eco Products, LLC</p>	<p>Dredged material pavers have the potential to be successful residential and commercial products and could be sold at equal or lower cost than traditional clay/shale pavers and used as green infrastructure to reduce runoff and infiltrate stormwater.</p>	<p>Research and Development (R&D) completed in 2022.</p> <p>The successful mixture contained 100% dredged material and met or exceeded ASTM standards for pedestrian and light traffic paving bricks.</p>
<p>Concrete traffic barriers and shoreline protection structures</p> <p>Northgate Environmental Management, Inc.</p>	<p>Dredged material is a cost-effective key ingredient in a new concrete barrier mix for low-stress uses like sidewalks, curbs, and gutters.</p> <p>Another potential use could include modular 3D-printed shoreline protection structures that could be used for wave attenuation and to address coastal stabilization concerns, including erosion from sea level rise and storm surge.</p>	<p>R&D completed in 2022.</p> <p>Modular 3D-printed shoreline protection structures could be considered for deployment in field conditions to address coastal stabilization concerns, including erosion from sea level rise and storm surge.</p>
<p>Re-engineered soil for growing sod</p> <p>FasTrak Express, Inc.</p>	<p>FasTrak worked with local project partners to combine dewatered dredged material with mushroom compost to develop a formulation for growing sod.</p> <p>Results showed that it is possible to use up to 50% dredged material in a re-engineered soil with adequate growth of grass. Soil components could contain seeds that are not suitable for sod, so it may only be appropriate for #2 grade sod.</p>	<p>R&D completed in 2023.</p> <p>Lessons learned regarding screening of materials, transport distances, etc., are being considered for future improvements.</p> <p>In addition to sod, other uses for 50% DM re-engineered soil to support grass include capping material, roadside restoration, and sports fields.</p>
<p>Lightweight aggregate</p> <p>Harford Industrial Minerals, Inc.</p>	<p>Dredged material as a lightweight aggregate has the potential to be successful when used in concrete mixtures, green roofs, or behind bridge abutments to relieve pressure on the superstructure.</p>	<p>R&D completed in 2023.</p> <p>Early success is promising, but need to identify a more effective binding agent and an efficient process for creating the sphere shape of the aggregate.</p>
<p>Concrete mixes for general use</p> <p>Susquehanna Concrete Products, Inc. (Suscon Products)</p>	<p>Dredged material as a concrete product has the potential to be commercially successful.</p>	<p>R&D completed in 2023.</p> <p>Together with Harford, a sister company, Suscon is considering full-scale development of a plant that could process DM into aggregates and concrete products.</p>
<p>Upland and shoreline berms using geotextile tubes (geotubes)</p> <p>CSI Environmental, LLC</p>	<p>Expected in 2024.</p>	<p>Project to continue through spring 2024.</p> <p>Geotubes are being monitored at upland and shoreline locations for vegetative establishment.</p>
<p>Vegetative earth berms</p> <p>University of MD</p>	<p>Baseline testing and data compilation have been completed. Results expected in 2025.</p>	<p>Additional testing and preparations for full scale prototype testing are underway, with the project expected to continue through summer 2025.</p>

Confined Aquatic Disposal

Identifying additional placement capacity for dredged material from Baltimore Harbor, beyond the Masonville and Cox Creek DMCFs, is challenging because property adjacent to the Port is densely populated and already developed. In addition to upland placement sites, MPA is exploring innovative alternative approaches to dredged material management, like Confined Aquatic Disposal (CAD). CAD is a technology in which deposits of sand and gravel are removed from a waterway's bottom to create a depression, or CAD cell. That depression is then filled with dredged material. The sand and gravel excavated to create the CAD cell could then be used in a variety of beneficial use or innovative reuse projects, such as shoreline restoration or wetlands and construction projects. CAD has been implemented successfully in other areas of the United States, including Boston and Newark Bay.

In 2011, the Harbor Team, a DMMP advisory committee, recommended CAD as an alternative to the limited capacity available in DMCFs and as part of the statutory mandate for the DMMP to provide a continuous, long-term strategic plan for dredged material management. In 2016, MPA constructed a pilot CAD cell at the Masonville Vessel Berth in Baltimore Harbor and began an extensive 2-year study of this new approach in Maryland. The 2016 CAD Pilot Project identified planning goals to be taken into consideration while exploring a second CAD pilot project: evaluate different site conditions that may influence other locations within the harbor region, operate a larger capacity cell with multi-use or multiple cells within an established area, and determine cost effectiveness.

Reviewing the Science, Responding to Stakeholders

MPA completed monitoring a CAD pilot project in 2019 and worked to evaluate lessons learned and determine next steps for the program. Planning and investigative efforts, including geotechnical investigations and hydrodynamic modeling within Baltimore Harbor, informed a proposed siting of a second CAD pilot cell in a location southeast of the Cox Creek DMCF. The area was presented to the Joint Evaluation Committee, a body of state and federal regulatory agencies, in February 2023 for feedback on the project and permitting strategies.

Concerns have been raised about the proposed location for the next CAD pilot project, so the project has been paused to ensure there is a thorough education and outreach process. This will include reviewing design alternatives and re-engaging the Bay Enhancement Workgroup. Simultaneously, MPA is developing and implementing a comprehensive outreach and engagement strategy focused on CAD in Baltimore Harbor and the importance of investigating emerging dredged material management approaches. MPA remains committed to transparency, ensuring the public and regulatory and resource agencies receive accurate and timely information and building confidence that future CAD endeavors will have no adverse effects on the environment or nearby residents.

Dredged Material Placement Sites

By Maryland statute, Baltimore Harbor is defined as all waters north and west of the North Point-Rock Point line. Baltimore Harbor dredged material must be redeposited in contained areas approved by MDE. Sediment dredged from Baltimore Harbor is currently placed in facilities owned by MPA, including the Cox Creek and Masonville DMCFs. Bay Channel materials are currently placed in Poplar Island and will be placed at Mid-Bay as Poplar Island reaches capacity.

» Mid-Bay is Underway

The Mid-Chesapeake Bay Island Ecosystem Restoration Project, often referred to as Mid-Bay, is located in Dorchester County near the severely eroded James and Barren Islands. It represents a crucial opportunity to build the capacity necessary for a successful 20-year DMMP strategy, all while restoring lost remote island habitat in a part of the Chesapeake Bay that has historically supported healthy fish and shellfish harvests, waterfowl populations, and recreational opportunities.

The model for this project is MPA's innovative approach to environmental restoration as demonstrated in the Poplar Island project, which is now a national paradigm. Mid-Bay will accommodate a total of 90-95 mcy of dredged

material used as a beneficial resource to restore 2,144 acres of remote island habitat. As Poplar Island reaches capacity, Mid-Bay will take over as the placement site for 2-3 mcy of sediment dredged annually from the Maryland Chesapeake Bay approach channel segments.

Barren Island

Phase I of Barren Island construction, the installation of the majority of the stone sills and breakwaters, has seen significant progress, with planned completion by October 2024. Barren Island Phase II will involve additional foundation and rock sill construction, as well as the creation of bird islands, confining units, and spillways. Phase III involves the placement of dredged material and wetland development, which will happen over many years and involve numerous separate dredging projects.

A public hearing and related poster session was held in November, offering the public an opportunity to give feedback regarding proposed modifications to the current Barren Island tidal wetlands license, which includes dredging sand from a borrow area that is needed for features associated with Phase II construction.

Throughout 2023, MPA and USACE worked closely together with community members, especially watermen, to reduce the impacts of construction on their livelihood. MPA held targeted outreach and public meetings and facilitated positive relations with the construction contractor as watermen navigated safety zones during fishing and crabbing season.

The Barren Island project will produce a multitude of economic, environmental, and community benefits over the next ten years, including:

- Up to 30% reduction in the storm-related shoreline erosion rate on the shoreline directly adjacent to Barren Island
- \$1M in personal property value benefits due to reduced wave energy, improved water quality and other effects of protecting seagrass
- \$1.5M in enhanced boating, fishing, and wildlife watching experiences
- 2 new bird nesting islands that add 8.5 acres of scarce nesting habitat for rare species
- A minimum of 72 new acres of wetlands supporting diverse wildlife, including diamondback terrapins and seabirds
- Protection for up to 1,300 acres of seagrass habitat for fish, crabs, and birds that otherwise would have been lost due to increased sedimentation and wave energy



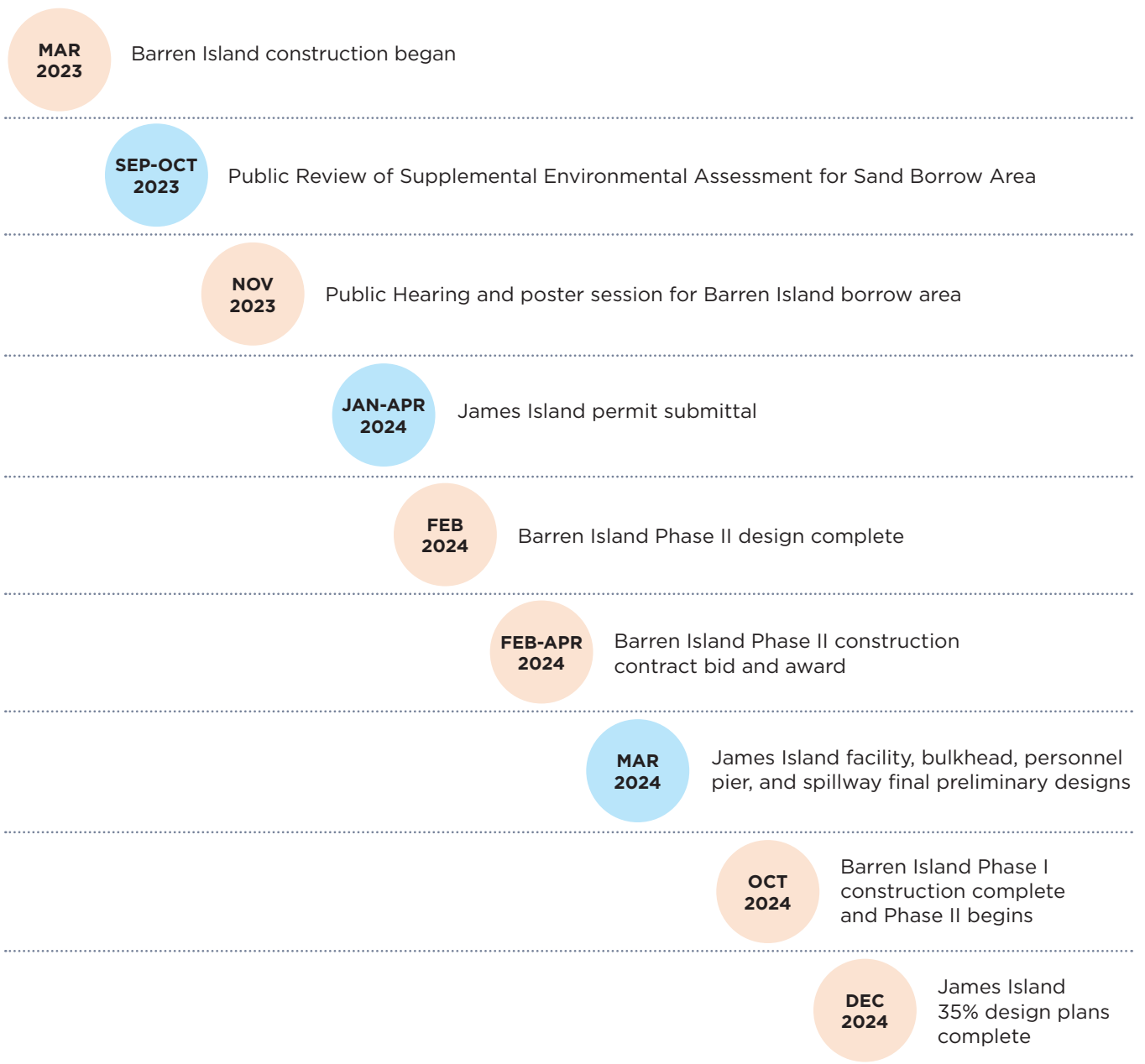
“Everything with the Mid-Bay Project seems to be going very well. The team let us know what they planned to do and are following through as planned.”

— Bobby Whaples, *Dorchester Seafood Harvesters Association*

James Island

The James Island portion of the project is in the design phase and is progressing on schedule. MPA and USACE are working in close coordination regarding National Environmental Policy Act (NEPA) requirements for the project. Additional close collaboration is underway with the Habitat and Monitoring working groups made up of regional agency and nonprofit stakeholders. MPA and USACE are conducting workshops to gather feedback and ideas from resource and regulatory agencies with the goal of incorporating more nature-based solutions into the James Island design. In September 2023, USACE and MPA held a workshop where agency input was used to identify potential alternatives. Selected features to assess include an increase in soft shorelines, oyster reefs, and a decrease in rock revetment are being modeled this fall. A second workshop will be held in winter 2023/24 to discuss modeling results and progress. Once the James Island exterior design is finalized, the team will continue collaborating on internal features to be included in the habitat restoration.

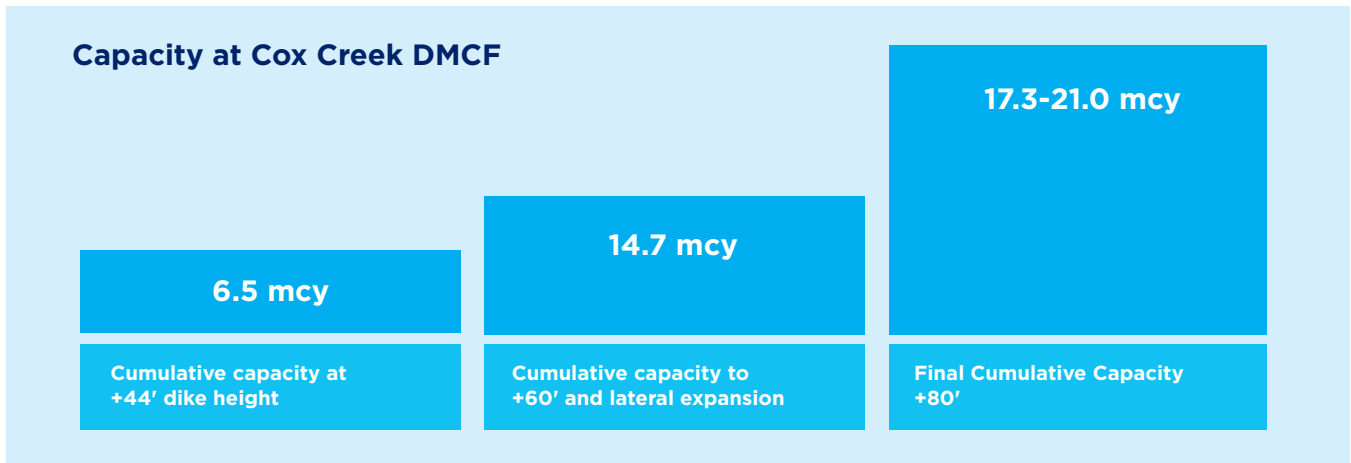
Mid-Bay Milestones



» Cox Creek DMCF

Expansion Boosts Capacity

The Cox Creek DMCF on the south side of the Patapsco River in Anne Arundel County, which has been receiving dredged material since 2005, is being expanded to increase its capacity. In 2023, MPA completed a significant construction milestone, raising the dike to +60 ft, contributing significantly to MPA's ability to meet its 20-year planning mandate. The maximum final agreed-upon dike elevation is +80 ft, and a feasibility study to prepare for the design of that expansion has begun and will include climate resiliency considerations. In order to maximize the capacity of this DMCF, efforts have focused on excavating material from a borrow area within the DMCF and utilizing it for construction to free up capacity. This excavated material is currently being stockpiled for future use.



The related mitigation project, a habitat restoration project at Genesee Valley Outdoor Learning Center, is underway and awaiting permitting approvals from the Maryland Department of the Environment (MDE). As a part of the project, two acres of wetlands are being created and enhanced mitigating for the wetland impacts resulting from the Cox Creek DMCF expansion. Once all permit approvals are obtained, MPA will submit a request to the Maryland Board of Public Works (BPW) to secure the land as a conservation easement and begin construction.

Cox Creek and the adjacent Swan Creek wetland area are rest stops for migrating birds, a nesting site for spring resident bird populations, and a magnet for birders. Official censuses, birding tours, and onsite staff have recorded 183 species, with 27 species confirmed as breeding on site.

Increasing Efficiency for IR

Also, at Cox Creek DMCF, a new road will provide access between the DMCF and the Cox Creek STAR Facility. The design is at 90% completion, and MPA is working with MDE to obtain plan approval in early 2024 through an expedited process. The access road will greatly increase the efficiency of moving material between the DMCF and the Cox Creek STAR Facility for IR purposes, and will also reduce noise, travel distance, and truck traffic in the surrounding community.

Floating, Adaptive Innovation Design

An innovative floating weir design has been implemented at Cox Creek and Masonville DMCFs, replacing the traditional spillway system that releases water from the facilities. This floating weir system is adaptable to increasing dike heights and reduces costs by eliminating the need to build a new fixed spillway each time the dikes are expanded. The floating weir design was adapted from a system used to clean floating oil spills. In an example of high-level problem-solving capabilities, MPA adapted this easy to use, cost-effective technology from another industry to realize new efficiencies.

Innovating to Improve Water Quality

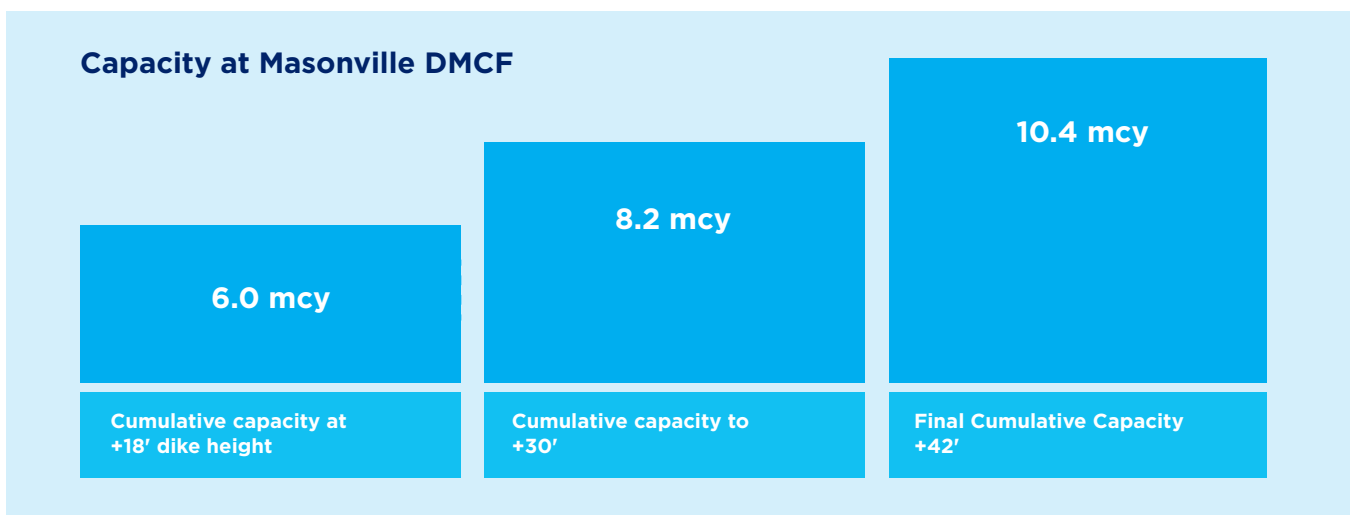
At Cox Creek DMCF, MPA is testing an innovative technology that would improve water quality at sites prior to water discharge. Manta Biofuel, Inc., a Maryland-based company founded by a University of Maryland graduate, developed a core magnetic separation technology, which is one of a suite of technologies developed to grow, harvest, and convert microalgae into renewable fuel. The technology can also be applied at DMCFs where it can be used to remove algae efficiently. In a 2023 pilot project, Manta processed water from the Cox Creek DMCF and demonstrated the technology to reduce total suspended solids, turbidity, and total phosphorus.

Building Together with Local Residents

The Cox Creek Citizens Oversight Committee (CC COC) continues to provide input to MPA regarding facility operations and recommendations on minimizing the potential impacts it may have on the communities and natural resources in the area. A recent project demonstrating this fruitful collaboration is the Swan Creek Nature Trail. Developed in coordination with CC COC and community stakeholders, the Swan Creek Nature Trail is a community enhancement project to create a ~2-mile loop in the Cox Creek Forested Conservation Easement Area. The trail design includes boardwalks, a bridge, outdoor classrooms, and informational and directional signage. The project has received federal grant funding from the Department of Transportation's Recreational Trail Program (RTP), totaling \$214,250. The final design for the Swan Creek Nature Trail is nearing completion and construction is planned to start next summer. The goal is to open the trail to the public by 2025.

» Masonville: Securing Storage and Stewardship

Masonville DMCF, located on the Middle Branch of the Patapsco River, has been active since 2010, is one of two sites for dredged material from Baltimore Harbor, and is currently undergoing expansion to increase capacity. Dike raising to +18 ft was completed in 2021. Base dike widening to prepare for additional elevation began in 2022 and was completed, under budget, in early 2023. Construction is now underway for dike raising to +30 ft. The innovative steep slope design of the expanded dikes maximizes DMCF capacity and also takes into consideration climate resiliency. Construction to +30 ft will take about 30 months to complete. The eventual goal is to raise the dikes to +42 ft by 2029. Raising the dikes to +42 ft will result in the site gaining approximately 4 mcy of capacity. All on-site and off-site mitigation associated with impacts from the construction of the DMCF have now been completed.



Masonville Cove Partnership: Intentional Inclusion For Over a Decade

In a city where high-rise buildings line much of the waterfront and streams lie beneath city streets and highways, Masonville Cove is a serene haven for people and wildlife, encompassing more than 100 acres of land, water, walking trails, and a pier for fishing. The campus' Environmental Educational Center, designed to be near-net zero in energy use, serves as a hub where area schools and community members participate in educational programs. In 2022, MPA worked with Maryland Environmental Trust and Baltimore Green Space to secure a conservation easement on the entire Masonville Cove area. The easement covers 46.8 acres of restored wetlands, uplands, and nature trails.

Long envisioned as a potential model for public-private partnerships that benefit the transportation sector, conserve nature, and enhance urban quality of life, the project has fulfilled this promise because federal agencies, state agencies, nonprofits, and community groups have worked diligently together to make it so. Initially, MPA partnered with two nonprofit organizations, the Living Classrooms Foundation and the National Aquarium. The US Fish and Wildlife Service (USFWS) joined the partnership in 2013 when Masonville Cove was named the nation's first Urban Wildlife Refuge Partnership. Now formally operating as the Masonville Cove Partnership, the group benefits from the unique specialties and perspectives of each member. Together, the partners continuously make new strides toward fulfilling their mission to inspire all people to discover, understand, and care for the natural world. As it works to provide equitable access to the outdoors and transformational opportunities for learning, recreating, and experiencing the restorative power of nature, the Partnership is building a better future together by empowering the next generation of environmental and community stewards.

Official 2023 wildlife censuses observed 179 bird species at Masonville, with 36 of those species confirmed as breeding on site.

Building New Trails, Improving Access

2023 marks the tenth anniversary of Masonville Cove's designation as the nation's first Urban Wildlife Refuge Partnership. Masonville Cove is now well established as an educational and recreational community treasure, but access can be challenging. Consistent with its promise to restore access to the waterfront for the communities surrounding the Masonville DMCF, MPA, and other partners have secured two grants totaling \$2.6M from the Federal Highway Administration (FHWA) Federal Lands Access Program (FLAP) and USFWS. These funds are being used to design and construct a shared use path named the Masonville Cove Connector. The Connector links Masonville Cove to the Gwynns Falls Trail and adjacent communities and will increase safe and equitable access to the site. Once complete, the Connector will tie into a chain of over 20 miles of trails, providing walking and biking connectivity with dozens of neighborhoods, a regional hospital, and wellness facilities.

The Masonville Cove Connector is currently in the planning stage; its development team is working closely with neighbors, community members, and current users of Frankfurst Avenue to share the news of this new project and seek input on how the Connector can best meet all users' needs. Two traffic studies have been conducted, and a set of design concepts have been developed. These concepts are being shared publicly via outreach to local stakeholders with the goal of obtaining stakeholder feedback in project development. The team continues to coordinate with adjacent trail projects as well as neighboring property owners. Final design is expected to be complete in early 2025, followed by construction.

Investing in Impact

The Partnership's fundraising efforts have doubled MPA's initial seed funding, resulting in over \$4.4M in grants and donations since 2006. Visitorship has increased, with 6,380 total visits to the site as of September 2023. Partner-led programs like environmentally themed workshops, support for fishers and anglers, debris cleanups, pollinator garden plantings, and community science events are driving increased interest among federal, state, and local agencies, as well as nonprofits and individuals wanting to connect with Masonville Cove.

» Poplar Island

MPA remains committed to exploring innovative and alternative partnerships and funding sources for using dredged material to restore ecosystems being lost to sea level rise, promote carbon sequestration, and otherwise address the effects of climate change.

The Paul S. Sarbanes Ecosystem Restoration Project at Poplar Island has been justly acclaimed around the world for its beneficial use of dredged material to restore remote island habitat and establish important ecosystem functions to support fisheries and wildlife populations. Lessons learned from this pioneering project are being incorporated into the planning and design of the Mid-Bay Project. Currently, Poplar Island has a remaining capacity of 24 mcy, 35% of the site's total capacity, and is expecting its next inflow in winter 2023/2024. The operational focus in 2023 has been on continued inflow, smooth operation, and reclaiming sand from the island. This sand is slated for use in future construction, which will save money and maximize the site's capacity. The next step in habitat development is the restoration of Cell 5CD. The 75-acre wetland cell is receiving its last material inflow in 2023/2024 with crust management and grading to follow and wetland planting anticipated in 2027/2028.

The restored island is a popular stopover site for migratory birds along the Atlantic Flyway and a haven for a variety of other wildlife. Official 2023 bird censuses have identified 174 species, with 34 species confirmed as breeding onsite. Several species that do not commonly breed in Maryland have raised young there. In 2023, American avocets and short-eared owls bred onsite for the first time, providing only the second and fourth breeding records, respectively, of these species in Maryland. Northern shovelers, which bred at Poplar Island for the fifth consecutive year, are recorded as breeding only at one other Maryland site, for a total of only six breeding records in the state, and gadwalls bred onsite for the third consecutive year.

Living Laboratory: Understanding Restoration and Habitat Use

Poplar Island is a frequent site for scientific study and research partnerships focused on developing principles and methods to maximize climate resiliency, improve wildlife habitat, and gain lessons learned, which can be applied to other beneficial use projects.

This summer, birders were thrilled by a confirmed sighting at all of MPA's DMCFs of a roseate spoonbill, a wading bird with brilliant pink feathers and a spatula-shaped beak. These striking birds inhabit the Southeast, where their numbers are rebounding after decades of declines, but they are rarely seen in the Mid-Atlantic, and this visitor has become a celebrity in birding circles.

In an ongoing study, researchers from the National Oceanic and Atmospheric Administration (NOAA) and the US Naval Academy are studying whether juvenile oysters, or spat, will set directly on stone reefs within the project's open water embayment rather than producing spat-on-shell in the lab before transplanting them onto a hard bottom reef structure. Early monitoring of the experimental placement has found natural recruitment of oysters onto the rock reefs. Lessons learned have the potential to make new habitats available for oyster spat, with benefits to oyster restoration efforts and water quality and is another innovative way MPA and their project partners work to improve the environment of the Chesapeake Bay.

NOAA also initiated a study to quantify differences in the use of restored marshes at Poplar Island. Acoustic telemetry is used wherein fish are surgically implanted with coded transmitters and their locations and habitat preferences are tracked using an array of battery-powered data receivers deployed in the marsh cells. Data is still being collected, but in 2023, they tagged 53 fish inside the marsh cells, including striped bass, white perch, gizzard shad, and American eels. Preliminary data evaluation shows species-specific range patterns and utilization of particular parts of the Poplar Island marshes.

Living Laboratory: Understanding Restoration's Role in Climate Change and Sea Level Rise

Multiple studies have been conducted or are underway that look at the relationships between dredged material wetland restoration and nutrients, Greenhouse Gases (GHGs), and long-term resiliency in the face of projected sea level rise.

University of Maryland Center for Environmental Science (UMCES) sediment and carbon sequestration studies show that over time (within 10 years) Poplar Island's restored marsh behaves similarly to Mid-Atlantic brackish marshes. Additionally, the high nitrogen supply drives high rates of carbon sequestration. The carbon sequestration helps fight climate change and also ensures the marsh's resiliency to sea level rise as the carbon is incorporated into the sediment and helps to increase the marsh elevation. Unlike nearby reference marshes, studies show that currently, Poplar Island marshes are keeping pace with sea level rise.

MPA also funded UMCES and the University of South Carolina to develop a site specific wetland model to investigate the resilience of restored Poplar Island marshes under predicted rates of sea level rise. A key finding was that Thin Layer Placement (TLP) of sediment onto the marsh at periodic intervals can be a successful strategy for increasing marsh resilience to rising sea level. Other benefits include added carbon sequestration from the growth of marsh plants and the full suite of ecosystem services provided by a healthy marsh. The costs identified were those associated with site operations, and the temporary loss of some ecosystem services while the marsh is recovering. The study also identified the ideal marsh elevation to ensure long-term marsh resilience to sea level rise. Planning for future development should include planting the native marsh grass *Spartina alterniflora* at the highest range possible and increasing the high marsh acreage in order to build in elevation capital (a place for low marsh to migrate as it responds to sea level rise). This research helps ensure that dredged material restored wetlands are built for long-term ecological benefits.

Community Connections

Some Marylanders have ties to Poplar Island that stretch back generations, and MPA is helping them reconnect with the era when their forebears lived on the island. When severe erosion made the island no longer habitable, residents moved away, leaving family graves behind but taking their headstones with them. One family is now returning those headstones to the island with support from MPA, which is helping with transportation and placement of the memorial markers and maintenance of the area.

» Hart-Miller Island: Next Steps in Restoration

Hart-Miller Island (HMI) is a haven for boaters near the mouth of Middle River in the northern Chesapeake Bay, providing the public with recreational opportunities and the chance to encounter many different species of plants, insects, and wildlife, including abundant migrating bird populations. HMI was the first DMCF in the Chesapeake Bay created with the dual purpose of dredged material placement and restoration of an eroding island complex. Active dredged material placement at HMI began in 1984 and ended in 2009. MDE recently recognized that the restoration of the 300-acre South Cell is complete. Under an interagency agreement between MPA, DNR, and Maryland Environmental Service (MES), the South Cell will continue to be owned and operated by DNR as a public state park.

Over 43,700 people visited HMI in 2023 to fish, camp, boat, swim, bike, hike, or picnic. This year, 207 species of birds were observed on official censuses, making it the #1 Hot Spot on the eBird list in MD this Fall. Thirty-two species were confirmed as breeding on site, including one of the only Maryland breeding pairs of trumpeter swans. Rare species observed included surf scoter, king rail, Hudsonian godwit, marbled godwit, red knot, ruddy turnstone, Wilson's phalarope, red-necked phalarope, buff-breasted sandpiper, alder flycatcher, and the site's first records of a roseate spoonbill and painted bunting.

Restoration planning by MPA and DNR, with input from community partners, is underway for the 800-acre North Cell. MPA is considering several habitat development designs and is investigating alternative designs that mesh with DNR and MPA's shared goals for the project. These goals include: seasonal habitat diversity, a mosaic of habitat types, passive recreation opportunities, optimal hydrology, and minimization of long-term operational and maintenance costs.

A Model Friendship

Since its initiation in 1985, the HMI Citizens Oversight Committee (COC) has ensured an open dialogue between the communities surrounding the site and MPA and has provided oversight on dredged material inflow and operations. Since inflow ceased at HMI, the HMI COC has shifted its focus to the development of a site closure plan and created a Friends of HMI State Park volunteer group. MPA coordinated with the Friends group to increase site access to the community through twice monthly access via boat for birding tours held May through September with bonus dates added, as requested. Lessons learned from its collaboration with Friends of HMI have allowed MPA to develop efficiencies and help support capacity building for the new Friends of Masonville Cove.

» Virginia Channels Options Under Study

Wolf Trap Alternative Placement Site, an open water dredged material placement site serving both the ports of Baltimore and Virginia, receives maintenance material from the York Spit Channel every three to five years. In response to concerns raised by the Virginia Marine Resources Commission (VMRC) regarding the protection of overwintering crabs, the Virginia Channels Bay Enhancement Working Group (VA BEWG) was created. VA BEWG met regularly from 2021 through 2022 and developed a shortlist of potential beneficial use projects, sites, and concepts that could serve as an alternative to open water placement at Wolf Trap.

USACE and MPA have entered into a jointly-funded Planning Assistance to the States program that will allow USACE to investigate the shortlisted options more closely. This will allow VA BEWG to narrow down the alternative options for placement. Viable solutions must be environmentally acceptable, cost-effective, and logistically efficient. In mid-2024, ~2 mcy will be dredged from the York Spit Channel to be placed at Wolf Trap Alternate Northern Expansion. Environmental coordination is ongoing.

► Outreach & Education

Investing in Equity and Opportunity

A top priority for MPA, outreach and engagement efforts continue to prioritize environmental justice, diverse representation reflecting the communities the Port serves, and increasing the public's knowledge about the Port to pursue outcomes that equitably benefit all Marylanders.

MPA has long recognized that providing education and collaborating with Marylanders is critical to the success of the Port and the DMMP and continues to invest in its diverse stakeholders. Over more than 20 years, MPA has built a highly successful engagement program that helps people understand the importance of the Port while ensuring that all affected constituencies have a voice in planning effective dredged material management options and pursuing mutually beneficial outcomes. MPA's outreach and education programs offer abundant opportunities for community engagement through public meetings, exhibits at community events, project site tours, and environmental education offered onsite or virtually.

Throughout 2023, the formal DMMP committee structure, adult education programs, student-focused education programs, and expanding stakeholder partnerships have been bolstered by new relationships, including collaborations with local Historically Black Colleges and Universities (HBCUs), civic organizations, and local faith-based congregations.

In total, MPA's education and outreach efforts in 2023 have resulted in nearly 20,000 engagements at 372 events.

Spanish Language Outreach

New MPA outreach initiatives in Spanish premiered this year as part of an ongoing commitment to increase inclusivity and equitable access to MPA's sites. Key outreach materials such as fact sheets have been made available in Spanish, other handouts and flyers will be offered in both Spanish and English, and Spanish-speaking staff will be at events as appropriate. A highlight of the year's outreach program was Latino Conservation Day, held on July 30 at Masonville Cove. A total of 118 people attended, including families from the surrounding area and from Latinx communities in Baltimore. Bus rides from nearby community locations supported accessible transportation. It was a full day of fun, activities, and bilingual support from many partners across the city and state, including the National Aquarium, the Masonville Cove Partnership, TAYR Church of God, the Patterson Park Audubon Center, and others.

Partnerships and Programs at Masonville Cove

This unique urban wildlife refuge continues to be a magnet for the public, receiving 6,380 visitors as of September 2023. As part of its commitment to equitable inclusion, staff of the Masonville Cove Partnership and USFWS have been participating in a course titled "Co-designing Conservation" with the goal of learning how to better work with local communities to develop conservation goals, projects, and programs that are curated for those communities. These inclusive principles are being implemented in and around Masonville Cove.

Recent community events and programs included a sound healing program hosted by a local small business, a butterfly hike, back-to-school events, the Brooklyn Branch Library Urban Wildlife Conservation Display, and First Thursday evening events and extended hours. New programs with an emphasis on the healing power of nature were particularly poignant in the wake of the nearby mass shooting that made national news. Wildlife programs and visitor outreach opportunities include bird banding with Birds of Urban Baltimore, where participants banded 571 birds from 53 species, monarch butterfly tagging, bat walks with Baltimore Green Space at Masonville Cove and Garrett Park, and winter mammal surveys. The Friends of Masonville Cove are also working with a local environmental justice organizer and holding events to encourage community members to collaborate as advocates for their local urban green spaces.

MPA supported the coordination of a Junior Ranger Angler program and outdoor skill center clinic in the summer of 2023, with participation by the City of Refuge nonprofit organization, the National Park Service (NPS), and USFWS. Reece Tremaglio, the youngest sponsored professional bass angler in the country and a role model among young anglers and anglers of color, headlined the event, which featured a full day of activities and programming. A total of six fishing programs, many for local community groups, have recently been held at Masonville Cove.

Cleaner, Greener Baltimore Neighborhoods with the Trash Wheel “Family”

In order to protect the constructed wetlands and carry out mitigation for the Masonville DMCF, MPA has worked with stakeholders to reduce the burden of trash in Baltimore neighborhoods and waterways. This innovative, multifaceted approach involves funding 19 solar compacting trash cans that have collected almost 200,000 gallons of trash in partnership with Baltimore City and an Adopt-a-Highway program that supports monthly cleaning of five one-mile stretches of roadway, resulting in the cumulative removal of 1,510 bags of trash. MPA also hosts Masonville Cove shoreline cleanups, drawing volunteers who removed more than 4.5 tons of debris this year.

MPA has also provided funding for four water-based trash wheels, world-renowned for their simple, innovative technology, which harness the power of stream flows to efficiently remove trash from waterways. Mr. Trash Wheel, Captain Trash Wheel, Professor Trash Wheel, and Gwynnda The Good Wheel of the West all help prevent trash from entering the Baltimore Harbor and Patapsco River. As of October 2023, the Trash Wheel family has collected over 2,779 tons of trash that would otherwise end up in the Chesapeake Bay.

Trash Wheels have also played an important role as environmental education and awareness tools, particularly on social media platforms. As of 2023, Captain Trash Wheel has over 5,005 social media followers across its three social media accounts, and the newest Trash Wheel, Gwynnda The Good Wheel of the West, has over 172 followers. Mr. Trash Wheel, the older brother installed in 2014, has over 73,000 followers on three social media platforms.

Opportunities for Youth to Learn and Explore

The Chesapeake Bay Trust and MPA sponsored the second annual Youth Birding Week in July. This summer camp program educates urban youth as a pathway to career opportunities, including those in STEM and maritime-related industries, while increasing access to DMMP sites. Eleven youth from the Baltimore area had the opportunity to spend a week learning the basics of birding and exploring habitats created at the Port’s DMCFs and restoration sites. The 7- to 11-year-olds started each morning at the Masonville Cove Environmental Education Center. They traveled to Poplar Island to learn about osprey and bird banding. They visited Swan Creek at Cox Creek DMCF to learn about the diverse species of fish that birds rely on. They also learned about bird species that nest at HMI on their trip there. The young birders concluded their experience by presenting posters to their parents, who also participated in birding activities at Masonville Cove.

Over 300 classrooms were engaged in 2023, of which:

34%

were Maryland Association for Environmental and Outdoor Education (MAEOE) Green School Classrooms (certified to include environmental education in the curricula, model best management practices at the school, and address community environmental issues)

60%

were Title 1 School Classrooms (schools with high numbers or high percentages of children from low-income families).

Career Connections

With support from MPA and industry professionals, the Baltimore Port Alliance hosted its fifth Hiring & Career Expo, bringing together 38 employers and nearly 250 job-seekers. This was the largest event to date, and 100% of surveyed exhibitors indicated they would attend a similar event in the future.

► **IMPACT SPOTLIGHT:** **Opening Doors for Careers in Conservation**

“An open mind leads to open opportunities” is a fitting summary from Samuel Adekoya, a participant in the Masonville Cove WildSTEM internship program. Over the course of six weeks in the Summer of 2023, four HBCU students with college majors and ambitions unrelated to conservation work joined the internship program with the goal of exploring how their major can be applied to a conservation career. MPA and partners co-hosted the program with the Harbor City chapter of The Links, Inc., a volunteer organization for African American women community leaders.

The interns were provided with exposure to conservation career paths, practical experience, a pathway for future conservation careers, and leadership opportunities in a wide array of career fields, including biology, criminal justice, computer science, urban art, and African American studies. They had access to invitation-only events, including an address by Vice President Kamala Harris and giving a briefing to professionals at the Department of the Interior. Other partners included the Masonville Cove Partnership and the Lillie May Carroll Jackson Charter School (LMCJ), and supplemental funding was provided by the Keith Campbell Foundation, Brown Advisory, and Mr. Truman Semans.

This unique experience had a deep impact on participants, whose perspectives on conservation careers changed as their interest was piqued by exposure to new sights, sounds, and ideas. Makayla Johnson, a rising sophomore at Bowie State University, entered the internship as a veterinary biology major and left it with a passion for a career in wildlife conservation and the potential opportunity to join the ranks of USFWS. Coppin State computer science intern Shayla Harris reflected, “This has been an amazing opportunity. I wish I knew about Masonville Cove before my internship. I will be a lifetime advocate of Masonville Cove.”

Attention to Detail Increases Access for Birders

MPA is working to create a standardized process for birding event registration across all DMCFs with an increased focus on equity, creating opportunities for newcomers and people from a variety of backgrounds to participate. A new, user-friendly, web-based system will be launched in 2024 to facilitate broader access to birding tours. A commitment to equitable access requires attention to details that may appear small, like tour registrations that avoid any appearance of favoritism, but the access that results can be a big, transformative benefit for individuals and communities and increase public acceptance of MPA and its mission.

A Boost for TERPs

Poplar Island hosts a thriving population of diamondback terrapins, Maryland's official state reptile. Over 20,000 terrapins have hatched on site since 2002. The goal of the Terrapin Education and Research Partnership (TERP) is to further the study of terrapin biology, inspire the next generation of Bay stewards through authentic, hands-on, cross-curricular learning experiences, and demonstrate how the Port's activities can benefit both the economy and the environment. In 2023, ~5,000 students participated in classroom outreach programs and field experiences, bringing the total number of student participants to date to more than 60,000.

Since 2005, over 3,000 terrapins, ~200 per year, have been head started by Maryland students. Terrapin hatchlings from Poplar Island are distributed to classrooms across Maryland, where under students' care, they get a "head start" by growing larger than wild turtles of the same age, boosting their chances for survival and, in the process, giving the students a strong sense of stewardship of their local environment. More than 930 classes have released head start turtles on Poplar Island field trips, and since 2009, more than 400 head start turtles have been seen again on the island during wildlife study, identified using tags they are equipped with at release.

Building the Future Together

This has been a year of notable progress for the Port and the DMMP when bold ideas moved from concept to reality. In 2023, MPA significantly increased its capacity to fulfill its mission by completing expansions at two existing facilities and began construction at a new site. It is in the process of developing the state's first center for innovative reuse of dredged material, an essential element of the program's long-term sustainability, and has succeeded in laying the legislative groundwork for the marketability of innovative products. After a thorough and cost-effective study, the DMMP also greenlighted long-hoped-for changes in berthing and channel configurations at the Port - changes which, combined with the expansion of the Howard Street Tunnel, are potentially transformative for the Port, the transportation industry, and the Maryland economy.

These successes have built on years of thoughtful planning, partnerships, and investments. The DMMP is equally proud of advances made in creating opportunities for education, recreation, employment, and stewardship for the people of Maryland. The tangible results of thoughtful capital investments, innovating technological solutions, and implementing forward-looking ideas are plainly visible at multiple sites.

► Our Vision for 2024

The intangible results of the investment in opportunities for all people and for conservation are emerging, and will become increasingly obvious over time. Maryland Port Administration will continue to work closely with Dredged Material Management Program committee members, elected officials, state and federal agencies, community organizations, business partners, and other stakeholders – especially Maryland’s young people, whom we hope will experience the benefits of Dredged Material Management Program’s successes -- to build a future together for many years to come. Looking ahead, we offer the following recommendations to further support the Port of Baltimore in achieving success that will benefit our region economically, environmentally, and socially for decades.

» Funding & Policy Recommendations

- Engage federal, state and local elected officials, the American Association of Port Authorities, and other federal and state partners to ensure favorable legislation and sufficient funding for priority Dredged Material Management Program projects, the United States Army Corps of Engineers navigation program, and projects that benefit and favorably position the Port of Baltimore in new legislation related to resilience and climate change.
- Leverage partnerships with stakeholders and related collaborative efforts to facilitate legislation and funding. Examples of this work include engaging with the Maryland Commission on Climate Change, working with the Maryland Green Purchasing Commission to establish purchasing specifications for recycled materials and products, and partnering with the Maryland Department of Natural Resources on a Regional Sediment Management Plan. These efforts will help the Dredged Material Management Program and the Port address sustainability, climate change, and resiliency planning.
- Seek available funding for Dredged Material Management Program-related greenhouse gas emissions reduction projects at the state and federal levels to meet the State’s target of 60% reduction by 2031 and net zero by 2045.

» Planning & Operations Recommendations

- Conduct capacity and dredging demand planning beyond a 20-year timeframe to support long-term sustainable dredged material management options. Continue planning, design, and construction for future expansions at Masonville and Cox Creek Dredged Material Containment Facilities and mitigate associated environmental impacts while achieving capacity recovery through the 2020 Innovative Reuse & Beneficial Use Strategy.
- Continue to remediate the Cox Creek Sediment Technology and Reuse (STAR) facility and prepare the site to implement long-term, large-scale Innovative Reuse and capacity recovery efforts.
- Incorporate the potential impacts of climate change and facilitate using nature-based and climate-resilient solutions into long-term Dredged Material Management Program project planning, Dredged Material Containment Facility design and operations, and related project delivery. Concurrently, leverage the best science available to quantify carbon sequestration benefits from the beneficial use of dredged material.
- Explore alternative funding and cost savings options to advance the Hart-Miller Island North Cell’s habitat design and future management in partnership with the Maryland Department of Natural Resources.
- Engage the United States Army Corps of Engineers, the Commonwealth of Virginia, resource agencies, and other stakeholders to refine the list of suitable, cost-effective dredged material placement options for the Virginia Channels, including beneficial use opportunities.
- Ensure that planning, design, construction, and operational efforts related to Dredged Material Management Program infrastructure and restoration projects strive to minimize environmental impacts, consider the equitable distribution of benefits, and ensure that vulnerable communities do not disproportionately bear associated adverse impacts.

» Outreach & Education Recommendations

- Prioritize environmental justice by working closely with affected communities and stakeholders to develop and implement strategies that promote fairness and equity in the Dredged Material Management Program to pursue outcomes that equitably benefit all Marylanders.
- Collaborate with and recruit members for all Dredged Material Management Program committees that reflect the diversity of the communities adjacent to and impacted by the Port of Baltimore and maintain transparency in Dredged Material Management Program decision-making processes.
- Create equitable access to Dredged Material Management Program sites to engage communities, including intentionally engaging youth in educational programs as a pathway to thriving career opportunities, including those in science, technology, engineering, and math (STEM) and maritime-related industries.
- Develop and implement a comprehensive outreach and engagement strategy focused on Confined Aquatic Disposal (CAD) in Baltimore Harbor and the importance of investigating emerging dredged material management approaches.

DMMP ANNUAL REPORT GLOSSARY OF ACRONYMS

Acronym	Meaning
AAPA	American Association of Port Authorities
ASTM	American Society for Testing and Materials
BPA	Baltimore Port Alliance
BPW	Board of Public Works
BU	Beneficial Use
CAD	Confined Aquatic Disposal
CC COC	Cox Creek Citizens Oversight Committee
COC	Citizens Oversight Committee
DMCF	Dredged Material Containment Facility
DMMP	Dredged Material Management Program
DNR	Department of Natural Resources
FHWA	Federal Highway Administration
FLAP	Federal Lands Access Program
FFY	Federal Fiscal Year
HBCUs	Historically Black Colleges and Universities
HMI	Hart-Miller Island
GHG	Greenhouse Gas(es)
IR	Innovative Reuse
IRBU	Innovative Reuse & Beneficial Use
LMCJ	Lillie May Carroll Jackson Charter School
MAEOE	Maryland Association for Environmental and Outdoor Education
mcy	million cubic yards

Acronym	Meaning
MES	Maryland Environmental Service
MDE	Maryland Department of the Environment
MLLW	Mean Lower Low Water
MPA	Maryland Port Administration
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
PAC	Ports America Chesapeake
PED	Preconstruction, Engineering, and Design
R&D	Research and Development
RTP	Recreational Trail Program
STAR	Sediment Technology And Reuse
STEM	Science, Technology, Engineering, and Math
TERP	Terrapin Education and Research Partnership
TLP	Thin Layer Placement
UMCES	University of Maryland Center for Environmental Science
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
VA BEWG	Virginia Channels By Enhancement Working Group
VMRC	Virginia Marine Resources Commission
WRDA	Water Resources Development Act