

A large container ship is docked at a port. A white gantry crane is positioned over the ship, with its cables extending down to the deck. The ship's deck is covered with stacks of colorful shipping containers in shades of yellow, red, blue, and green. The ship's hull is dark red and black, with the letters 'MSC' visible. The background shows a wide body of water under a blue sky with scattered white clouds. In the distance, a bridge and some industrial buildings are visible on the horizon.

# MDOT MPA Dredged Material Management Program

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## Annual Report 2022

Port of Baltimore USA

Port of Baltimore USA

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DREDGED  
MATERIAL  
MANAGEMENT  
PROGRAM

# 2022 ANNUAL REPORT OVERVIEW

2022

Q1  
Jan-Mar

## INNOVATING, INVESTING, AND IMPLEMENTING

- Mid-Chesapeake Bay Island Ecosystem Restoration Project (Mid-Bay Project) received \$84M in federal construction funding on behalf of the US Army Corps of Engineers (Corps) for supplemental work plans to advance the Barren Island and James Island portions of the project.
- Masonville Dredged Material Containment Facility (DMCF) base dike widening began.

Q2  
Apr-Jun

- The location of the next Confined Aquatic Disposal (CAD) pilot cell was identified.
- A Memorandum of Agreement was executed between the Maryland Department of Transportation Maryland Port Administration (MDOT MPA), US Department of Interior, and Federal Highways Administration to fund the design and construction of a recreational shared use path connecting Masonville Cove to the Gwynns Falls Trail and adjacent communities.
- The Baltimore Port Alliance hosted a spring Hiring and Career Expo bringing together employers in the maritime industry and hundreds of individuals seeking employment at all levels.

Q3  
Jul-Sep

- Seven Research and Development Innovative Reuse (IR) projects are underway to allow MDOT MPA to identify high-volume, sustainable reuse applications to support long-term strategic planning and identify the critical steps to making large-scale IR a reality.
- A conservation easement was finalized for Masonville Cove with Maryland Environmental Trust and Baltimore Green Space.
- Construction of the Cox Creek DMCF waterside dike to elevation +44' was completed as part of the expansion.
- Thirty percent of the design was completed for the Fleming Park Shoreline Restoration project in partnership with the Turner Station Community.
- Virginia Channels Bay Enhancement Working Group (VA BEWG) completed their Phase 1 milestone to identify and rank potential alternative solutions for dredged material placement in Virginia from the Virginia Chesapeake Bay approach channels subset of the Baltimore Harbor and Channels Civil Works Project.
- The Inaugural Youth Birding Week was hosted at the four DMCF sites in Maryland.
- The Corps awarded the first contract for construction at Barren Island as part of the Mid-Bay Project.
- The Seagirt Loop Integrated Feasibility Study and Environmental Assessment Agency Decision Milestone was completed.

Q4  
Oct-Dec

- The design process began for the Masonville Cove Connector along Frankfurst Ave., linking Masonville Cove to the Gwynns Falls Trail and adjacent communities.
- The Seagirt Loop Integrated Feasibility Study and Environmental Assessment draft final report was submitted to Corps headquarters.
- The Board of Public Works approved acquisition of the property adjacent to the Cox Creek DMCF to further long-term capacity recovery efforts through large-scale IR.
- 100 runners participated in the 3rd Annual Hart-Miller Island (HMI) 5-Miler.
- The Baltimore Port Alliance hosted a fall Hiring and Career Expo.

## ► Reporting on 2022: Building the Future Together

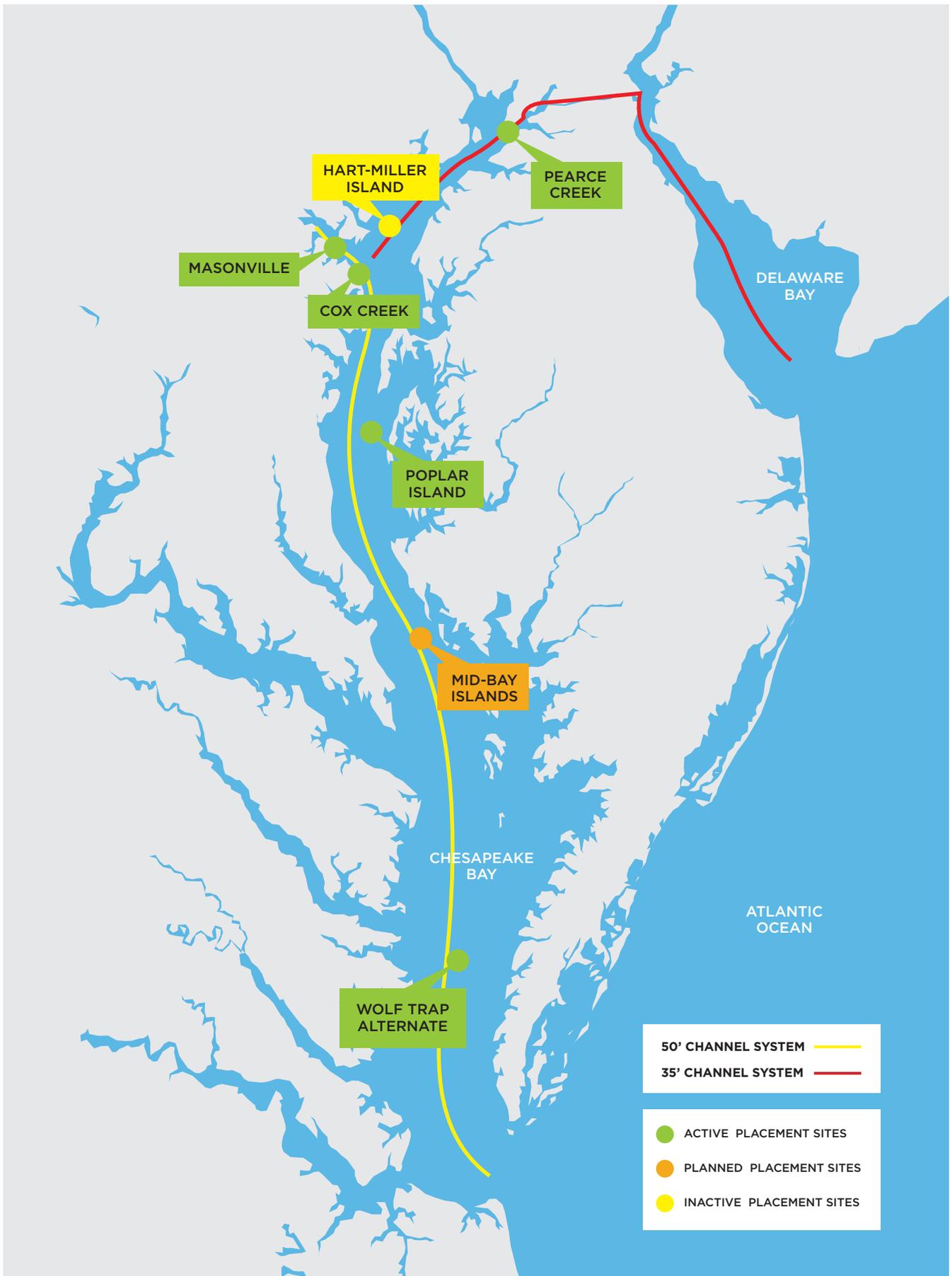
This report to the Dredged Material Management Program (DMMP) Executive Committee provides a:

- Concise overview of the Maryland Department of Transportation Maryland Port Administration's (MDOT MPA) long-term dredged material management plans
- Overview of accomplishments and the critical partnerships upon which program success is built
- Set of comprehensive recommendations for 2023

We are pleased to report that the DMMP continues to provide innovative solutions while delivering on the mission to maintain the Port of Baltimore's (Port) 50-foot-deep channel system and ensure its commitment to science-informed decision making and pursuing outcomes that equitably benefit all Marylanders. Capitalizing on the substantial investments made over the past several years, numerous multi-year planning efforts have provided the foundation for a very successful year.

The Port is one of only four East Coast ports with a 50-foot channel. Improvements that added a second 50-foot berth now allow two of the world's largest vessels to be serviced simultaneously. Complementing the recent improvements to Seagirt Berth 3 are plans to expand Baltimore's Howard Street Tunnel. This improvement will allow for the transit of double-stacked container rail cars out of the Port, clearing a longtime hurdle and providing seamless double-stack capacity from Maine to Florida. Combined, these efforts will increase annual container capacity handling from the current 900,000 to 1,400,000 TEUs (twenty-foot equivalent units) by 2027, and several shipping companies have announced new service to Baltimore as a result.

These important results bear witness to the strength of strategic long-term planning, a comprehensive approach to stakeholder collaboration that leads to mutually beneficial outcomes, and the importance of the DMMP in facilitating the Port's overall success.



## » MDOT MPA's Mission

MDOT MPA continues to work diligently to closely align its statutory mission to stimulate waterborne commerce through the ports in Maryland with enhanced stewardship of our natural resources and the health and well-being of the Chesapeake Bay watershed and communities. Ensuring responsible waterborne commerce requires significant maintenance dredging of the 130+ mile navigation channel system. This work lies at the heart of the Office of Harbor Development's responsibilities and is executed via the DMMP. Working collaboratively with stakeholders, the DMMP identifies cost-effective, innovative, and environmentally sound long-term placement and capacity solutions, from beneficial use to expansion of existing facilities. For more than twenty years, the DMMP has been providing a roadmap for these efforts - investing in, improving, and maintaining the navigation channels that serve the Port, promoting environmental stewardship to benefit the Bay watershed, and driving outcomes that provide economic, environmental, and social benefits for Maryland.

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## ► Innovating, Investing, & Implementing

The Port is one of Maryland's most vibrant and important economic engines. Building the Port's future with stakeholders is a multi-faceted effort combining innovation, investment, and implementation. Our processes bring together the technological advancements and investments needed to maintain our channel and berthing systems that enable safe passage in and out of the Port. Long-range capacity planning and implementation includes site engineering, permitting and compliance, and operations optimization at dredged material placement sites. Complementing these efforts, our comprehensive stakeholder engagement approach ensures we operate in ways that produce mutually beneficial outcomes for all Marylanders. In this context, we highlight key policy, planning, operations, outreach, and education issues to be addressed to ensure continued success.

## » Funding & Policy

### » Investing in Expansion and Implementation

MDOT MPA makes every effort to contain costs and seek solutions to foreseeable challenges while managing long-term dredged material capacity needs. In doing so, MDOT MPA works closely with the MDOT Secretary and Governor's Offices to secure state and federal funding opportunities. Recent historic federal funding levels have led to bold investments, from electrifying rail yard equipment to reducing carbon emissions to rebuilding critical Chesapeake Bay remote island habitat. To bolster these efforts, MDOT MPA consistently engages with a full array of stakeholders to build understanding and support for addressing current and future needs. To facilitate these collaborations, MDOT MPA hosts port tours, convenes round tables, and conducts regular meetings with the Maryland Congressional Delegation, the Maryland General Assembly, and various community stakeholders.

MDOT MPA must meet its statutory mandate (Md. Code Ann., Envir. § 5-1104.2) to provide a rolling, long-term plan for dredged material management and adequate capacity to maintain the Port's approach channels. Currently, MDOT MPA is vertically expanding the Masonville DMCF and vertically and laterally expanding the Cox Creek DMCF, while prioritizing Innovative Reuse and Beneficial Use (IRBU) and exploring future solutions like Confined Aquatic Disposal (CAD). These combined initiatives nearly satisfy the 20-year plan for Harbor maintenance material but not for new dredging projects (private sector new work material is currently not accepted).

## PORT OF BALTIMORE 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

With increased investment, several Harbor Development projects have moved from planning to implementation and are progressing on or ahead of schedule. The Mid-Bay Project, a top priority, received \$84 million (M) in federal construction funding on behalf of the US Army Corps of Engineers (Corps) for Infrastructure Investment and Jobs Act supplemental work plans to advance the project.

Additionally, seven Research and Development Innovative Reuse (IR) projects are underway to allow MDOT MPA to identify high-volume, sustainable reuse applications that can support long-term strategic planning and facilitate making large-scale innovative reuse a reality. The Maryland Board of Public Works (BPW) recently approved MDOT MPA's acquisition of the property adjacent to the Cox Creek DMCF for future capacity recovery and IR projects.

### » Policy Alignment for Emissions Reductions

With the passage of the Climate Solutions Now Act (CSNA), Maryland has set the country's most aggressive greenhouse gas reduction targets. The CSNA provides state funding and oversight to reduce pollution in underserved and overburdened communities. The Port will need additional funding for Green House Gas (GHG) emissions reduction programs to meet the new target of 60% reduction by 2031 and net zero by 2045. Providing

opportunities to address these needs, the federal Inflation Reduction Act is advancing complementary port funding initiatives. The Act includes \$3 billion over five years for the installation of electrified equipment to reduce emissions at ports. The Port will continue to seek funding from these sources and leverage new policy opportunities to plan and build an even more sustainable Port of Baltimore.

**Equipment Upgrades = Emission Downgrades**

The Port is now utilizing four additional supersized, Neo-Panamax container cranes which are part of a \$166 million investment made by Ports America Chesapeake (PAC) at the Seagirt Marine Terminal and are serving the new second deep-water berth. Having an additional deep berth allows the Port to serve two supersized cargo ships simultaneously. These larger cranes are fully electric without any diesel emissions and are part of a significant expansion providing greater capacity and efficiency to handle anticipated increases in container volumes.

**MDOT 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.**



The ongoing work to implement a modern, efficient fleet for the Port will continue to drive economic, environmental, and community benefits. In 2022, The Environmental Protection Agency (EPA) awarded a \$1.8M grant for the Port’s Diesel Equipment Upgrade Program (DEUP) to replace older cargo-handling equipment and dray trucks with newer, cleaner, more efficient models thereby reducing emissions from Port operations. Since the program began in 2008, 118 pieces of diesel cargo handling equipment (e.g., forklifts, top loaders, locomotives, tugboats) have been replaced or retrofitted with cleaner-running, more fuel-efficient engines. These improvements have prevented more than 5,100 tons of emissions. The Port’s Dray Truck Replacement Program, launched in 2012, has replaced more than 275 additional trucks with cleaner, more modern vehicles. In total, since the inception of the DEUP, MDOT MPA has received over \$10.5M in funding to support upgrades of nearly 400 vehicles. With these successful and innovative fleet programs, the Port’s approach now serves as a model for sister state agencies seeking to leverage the latest technology while enhancing the economic and environmental interests of the region.

## **Doubling Down on Double-Stacking**

In November 2021, after years of planning and investment, Maryland broke ground on the long-awaited Howard Street Tunnel expansion project. This project will alleviate the last remaining transportation bottleneck on the East Coast and create the shortest distance high-capacity rail conduit from the Mid-Atlantic to the upper Midwest. By reconstructing the 127-year-old, CSX-owned freight rail tunnel, double-stacked intermodal container trains will move in and out of the Port, effectively doubling the throughput capacity.

The project consists of vertical clearance improvements at the Howard Street Tunnel and 21 other locations between Baltimore and Philadelphia. Construction is underway and is expected to be completed in 2025. In addition to increasing containerized freight capacity, the project will improve supply chain efficiency for shippers, reduce highway congestion for communities, and deliver environmental benefits from increased use of rail, which is far more fuel efficient than trucks.

## **Climate Resilience**

MDOT 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 DMCFs. Collaboration is key. MDOT MPA is an active participant in the Maryland Commission on Climate Change (MCCC) and works closely with sister agencies and academic partners to identify opportunities to proactively plan and implement measures to reduce climate change impacts. Examples include:

- The Mid-Bay Project, which will restore remote island, wetland, and upland habitat through the beneficial use of dredged material and decrease local erosion
- A community partnership pursuing the Fleming Park Shoreline Restoration Project, which involves revitalizing a recreational asset in Baltimore County by using dredged material to provide ecological uplift and restoration to Fleming Park
- The sharing of data between MDOT MPA, the MCCC, University of Maryland Center for Environmental Science (UMCES), and others related to carbon sequestration in marshes on Poplar Island to support scientific advancements, including the International Blue Carbon Initiative, a coordinated, global program focused on mitigating climate change through the conservation and restoration of coastal and marine ecosystems

MDOT 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.

## **» Planning & Operations**

### **» Mid-Bay Underway**

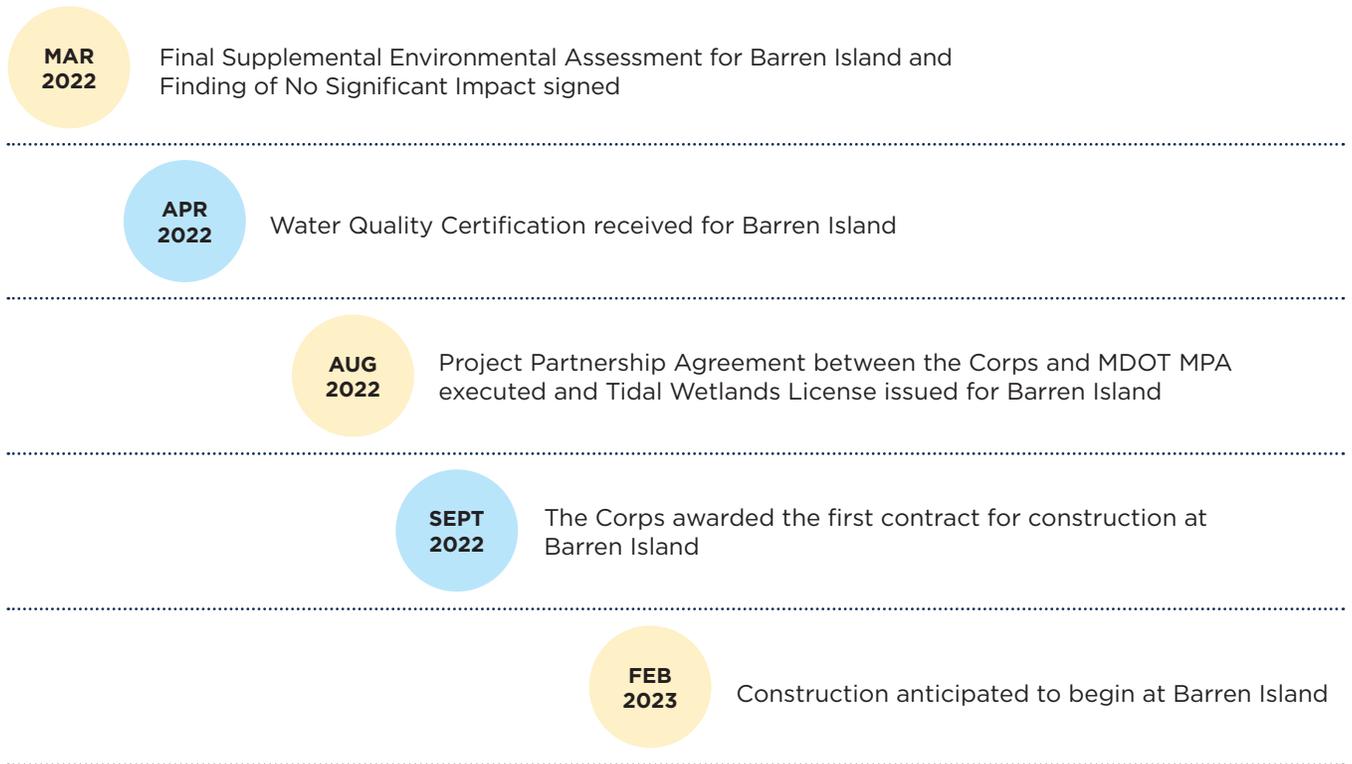
MDOT MPA's innovative approach to environmental restoration using dredged material is the foundation for the Mid-Bay Project. This project, located in Dorchester County near what remains of James Island and Barren Island, is a crucial future placement site and is integral to the Port's 20-year DMMP strategy. Mid-Bay will accommodate nearly 2-3 million cubic yards (mcy) of sediment to be dredged annually from the Maryland Chesapeake Bay approach channel segments while also restoring 2,144 acres of remote island habitat.

Once Poplar Island reaches capacity in 2033/2034, Mid-Bay will accept 2-3 mcy of annual maintenance dredged material from the Maryland Chesapeake Bay channel segments. The first phase of construction at Barren Island will soon be underway. Pre-construction engineering and design are underway for James Island, with construction anticipated to start in 2025. Inflow at James Island is anticipated to begin in 2030 before Poplar Island reaches maximum capacity.

### Mid-Bay Benefits

<b>Preserves</b>	Existing island remnants and habitats
<b>Restores</b>	2,144 acres of remote island habitat, including 1,212 acres of tidal wetlands
<b>Protects</b>	Existing seagrass beds at Barren Island and promotes conditions to establish additional seagrass beds
<b>Enhances</b>	Diverse wildlife habitat for avian and recreationally/commercially important fish species
<b>Reduces</b>	Erosion to local shorelines by decreasing wave heights
<b>Sustains</b>	Reliable navigation by providing 30+ years of dredged material placement capacity

### Mid-Bay Milestones



## Barren Island Benefits

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 Upper Hoopers Island and the area north of Fishing Creek
- \$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
- 83 new acres of wetlands supporting diverse wildlife including Diamondback Terrapins and seabirds
- Up to 1,300 acres of seagrass habitat for fish, crabs, and birds will be protected that otherwise would have been lost due to increased sedimentation and wave energy

Once the James Island design is finalized, the outcomes and benefits related to its restoration will emerge.

## Optimizing Opportunities

As a multi-billion dollar ecosystem restoration project, Mid-Bay presents an incredible opportunity to implement climate resiliency and nature-based solutions into the design by building upon the successes at Poplar Island and other Corps Engineering with Nature Projects throughout the country, and by utilizing the expertise of DMMP members and partners into the planning and implementation of the project. As a first step in this process, the DMMP has formed a Mid-Bay Resiliency Workgroup consisting of state and federal resource and environmental agencies, academia, and public interest organizations that are exploring design elements that can improve the ecological uplift of the project and enhance climate resilience for the project and nearby communities. To fully leverage the project as the next generation of nature-based and climate resilient solutions in reusing dredged material, it will be necessary to implement a highly collaborative process and timeline for MDOT MPA and key offices within the Corps to receive input from federal and state resource agencies, assess alternatives, and maximize opportunities within the parameters of the project authorization. There are also historic opportunities to leverage partnerships, access unprecedented federal infrastructure funding, and implement the recent [White House Roadmap](#) within the framework of the project.

### » Deep Water Loop Channel at Seagirt

The current deep-water berths at Seagirt Marine Terminal are realizing their potential, but the configuration is inefficient for ships to navigate, creating a capacity bottleneck. MDOT MPA requested that the Corps study deepening the entire Seagirt-Dundalk access channel system, allowing ships to move in a continuous forward loop through a 50-foot-deep channel, removing the need to back up and turn around. This Seagirt Loop Feasibility Study, a 3-year study cost-shared equally between MDOT MPA and the Corps, advanced through the Corps' Agency Decision Milestone with a Recommended Plan in 2022 to deepen the channel to 50 feet.

With this result, the Corps has determined that the project is in the federal interest and the study is scheduled for completion by September 2023. Preliminary construction costs for the loop completion are estimated at \$59M and would be executed with a 75% federal/25% state cost-share, resulting in an MDOT MPA contribution of approximately \$14.75M. In tandem with the finalization of the Corps' Chief of Engineers Report, MDOT MPA will work with federal partners to include the project in subsequent Water Resources Development Act (WRDA) legislation and appropriations bills.

### **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.

#### **Making Innovative Use of Additional Property**

In late 2022, the Maryland BPW approved MDOT MPA's acquisition of the property adjacent to the Cox Creek DMCF to further long-term capacity recovery efforts through large-scale IR of dredged material. The property acquisition is a critical step in advancing the Innovative Reuse Program. Upon acquisition and execution of the Administrative Consent Order, a phased approach to remediation will begin. Concurrently, a portion of the site will be immediately accessible for drying and stockpiling dredged material recovered from the Cox Creek DMCF.

MDOT MPA is also making productive use of every acre of available property by exploring the potential use of the north/south cross dike at Cox Creek and the Kurt Iron Slip at the Masonville DMCF for drying and/or stockpiling dredged material for IR end uses.

#### **» Amplifying Innovation**

The IRBU website tool launched in late 2021 continues to serve as a resource and provides a formal dredged material request process.

With strong community support and increasing educational efforts, MDOT MPA continues to implement its IRBU strategy which provides clear policy, regulatory, and technical actions. Efforts to explore feasible reuse applications for Harbor dredged material proceed with the Maryland BPW approval of seven contract awards to support applied research and development projects that will help facilitate making large-scale IR a reality.

## IR DEVELOPMENT PROJECTS

Company	To study and demonstrate the feasibility of using dredged material from	Results
Belden-Eco Products, LLC	Cox Creek DMCF in ceramic bricks and permeable pavers	Dredged material pavers have the potential to be successful residential and commercial products and could be sold at equal to or less than the cost of traditional clay/shale pavers.
Northgate Environmental Management, Inc.	Cox Creek DMCF in developing concrete traffic barriers and shoreline protection structures	<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>Two of the concrete barrier mix designs have the potential to be used for alternative products with lower strength requirements like sidewalks, curbs, gutters, medians, electrical conduits, and drainage structures.</p>
FasTrak Express, Inc.	Cox Creek DMCF in the development of re-engineered soil for growing sod	Pending
Harford Industrial Minerals, Inc.	Cox Creek DMCF in the production of lightweight aggregate	Pending
Susquehanna Concrete Products, Inc. (Suscon Products)	Cox Creek DMCF in various concrete mix designs for the production of general use concrete products	Pending
CSI Environmental, LLC	Masonville DMCF to develop upland and shoreline berms using geotextile tubes	Pending
University of Maryland	Cox Creek DMCF to create vegetative earth berms	Pending

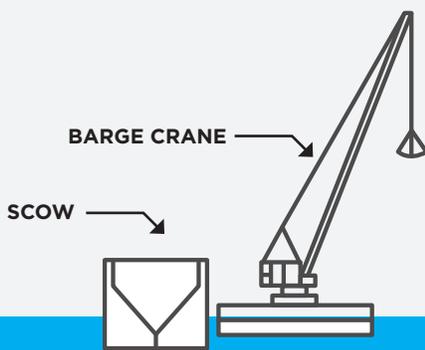
### » Implementation Update

Harbor dredging projects, including Fort McHenry Channel maintenance, Dundalk Marine Terminal Berth 3 Reconstruction, and Ports America Chesapeake Berth 3 pocket maintenance dredging, have led to inflow of dredged material at the Masonville and Cox Creek DMCFs. These two sites, working together as a system, can nearly accommodate current Harbor maintenance dredging demands. It is imperative that both the Masonville and Cox Creek expansion projects advance on schedule and that operations at each site allow for maximum capacity in order for MDOT MPA to meet annual Harbor-area maintenance dredging demands from the Corps, MDOT MPA, and the private sector.

## Confined Aquatic Disposal

Confined Aquatic Disposal is an emerging dredged material management approach using underwater space created by newly excavated material to safely place Harbor dredged material. MDOT MPA completed monitoring a CAD pilot project in 2019 and has been working to evaluate lessons learned and determine next steps for the program. Preliminary planning and investigative efforts have informed the selection of a new pilot project site in open water southeast of the Cox Creek DMCF to allow further study under different environmental conditions. Final design is anticipated in 2023.

### How Does CAD Work?



For the Port of Baltimore, construction of a CAD cell would usually begin by dredging a thin layer of silt and clay on the river bottom and placing it in a DMCF. Next, a layer of sand and gravel would be removed to deepen the cell, but only in the areas underlain by a relatively thick impervious clay layer known as the Arundel Formation. The resulting cell (or depression) would then be filled with dredged material from the Baltimore Harbor. The nearly watertight clay underneath the cell creates a barrier, effectively eliminating the potential for deposited sediments to interact with aquifers that lay still deeper beneath the surface.

### PATAPSCO RIVER

SOFT HARBOR MUD LAYER

SOFT SILTS AND CLAYS

SAND & GRAVEL LAYER

CAD CELL

CLAY LAYER

ROCK AND SEDIMENT LAYER

BED ROCK LAYER

## Cox Creek Expansion Implementation Realized

MDOT MPA is ahead of schedule with the Harbor Team-recommended Cox Creek DMCF expansion, which entails vertically raising the dikes and extending the DMCF westward onto the MDOT MPA-owned upland property. Permits and authorizations have been obtained, and work is underway. The dikes will be raised to +60 feet by 2024, providing 14.8 mcy of capacity.

Construction of the Cox Creek DMCF north/south cross dike between the existing DMCF and the expanded upland area is also complete, enabling the facility to continue to receive inflow during the construction expansion. The design and permitting of the associated Cox Creek DMCF expansion mitigation project conducted in partnership at the Genesee Valley Outdoor Learning Center is nearing completion, and BPW approval is expected to secure the easement enabling construction.

### Capacity at Cox Creek DMCF



**177 bird species have been observed at the Cox Creek DMCF and adjacent Swan Creek wetlands, with 28 species confirmed as breeding on site.**

#### Cox Creek Community Partnership

The Cox Creek Citizens Oversight Committee (CC COC) continues to provide recommendations to MDOT MPA regarding facility operations and minimizing the potential impacts on the communities and natural resources in the area. Work includes recommendations to reserve capacity in the DMCF for northern Anne Arundel County Department of Public Works maintenance dredged material, constructing a walking trail around the 100+ acre conservation easement and Swan Creek wetland area, and installing navigation aids in the Cox Creek channel. The design of the Swan Creek Nature Trail, a CC COC-recommended community enhancement, is expected to be completed in early 2024.

#### Masonville DMCF Raising

Masonville DMCF base dike widening and raising will increase capacity and allow the site to follow its 20-year plan for placement capacity in conjunction with the Cox Creek DMCF. Base dike widening began in January 2022 and is expected to be completed in March 2023. This wider, more stable dike will support the vertical increase of the DMCF dike elevation, first to +30 feet and eventually +42 feet by 2029, with projected total capacity of 10.4 mcy.

### Capacity at Masonville DMCF



The conceptual design of the stormwater conveyance to support the ultimate elevation of +42 feet is complete, and the +30 foot erosion and sediment control plans and Joint Permit Application package for the Dam Safety Permit were submitted this summer. Detailed specifications are being prepared to start procurement by January 30, 2023, and construction to +30 feet is anticipated to begin during the summer of 2023. Raising the dikes to +42 feet will result in the site gaining approximately 4 mcy of capacity critical to maintaining the 50-foot channel system.

All on-site and off-site mitigation from impacts of constructing the DMCF has been completed, and as a final protective measure, MDOT MPA worked with Maryland Environmental Trust and Baltimore Green Space to secure a conservation easement on the entirety of the waterfront property covering 46.8 acres of restored wetlands, uplands and nature trails. The Masonville Cove Campus, originally developed as a community enhancement tied to the creation of the DMCF, is a refuge and gateway, reconnecting communities to the water by providing public access to the shoreline, piers, and trails. The formal conservation easement ensures that the land must be used for conservation purposes in perpetuity.

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**Official wildlife censuses include 160 bird species observed on site, with 26 species confirmed as breeding in 2022.**

### **Growing Greener Neighborhoods Surrounding Masonville Cove**

MDOT MPA, in conjunction with stakeholders, has created a multifaceted and innovative approach to helping reduce trash in Baltimore neighborhoods and surrounding waters by:

- Funding 19 solar compacting trash cans that have collected almost 200,000 gallons of trash in partnership with Baltimore City
- Hosting Masonville Cove shoreline cleanups with volunteers who removed over 4 tons of debris
- Funding an Adopt-a-Highway program that supports monthly cleaning of five one-mile stretches of roadway that has removed 14 tons of trash
- Providing funding toward the four world-renowned trash wheels that have removed 2,342 tons of debris; one of which, Captain Trash Wheel, is located at Masonville Cove

### **Masonville Cove Partnership: Intentional Inclusion for Over a Decade**

In a city filled with pavement and skyscrapers, Masonville Cove serves as a green oasis for wildlife and people in Baltimore. The Masonville Cove Campus features over 100 acres of land and water, walking trails, and a pier for fishing and launching watercraft. The campus also includes a near-zero net energy environmental education center that serves as a hub for educational programs for area schools and community members.

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**Preserving the commitment to the community via intentional engagement and partnership-centered approaches is critical and will drive collective impact.**

Federal and state agencies, non-profits, and community groups have partnered to make the campus and its benefits a reality. MDOT MPA partnered with Living Classrooms Foundation and the National Aquarium and the USFWS joined the partnership in 2013 when Masonville Cove was designated the nation's first Urban Wildlife Refuge Partnership. This group now formally operates as the Masonville Cove Partnership with each partner bringing a unique specialty and perspective to the operation.

By providing equitable community access to nature and transformational recreation and educational opportunities, the Partnership is inspiring all people to explore, discover and respect nature and empowering the next generation of environmental and community stewards.

### Investing in Impact

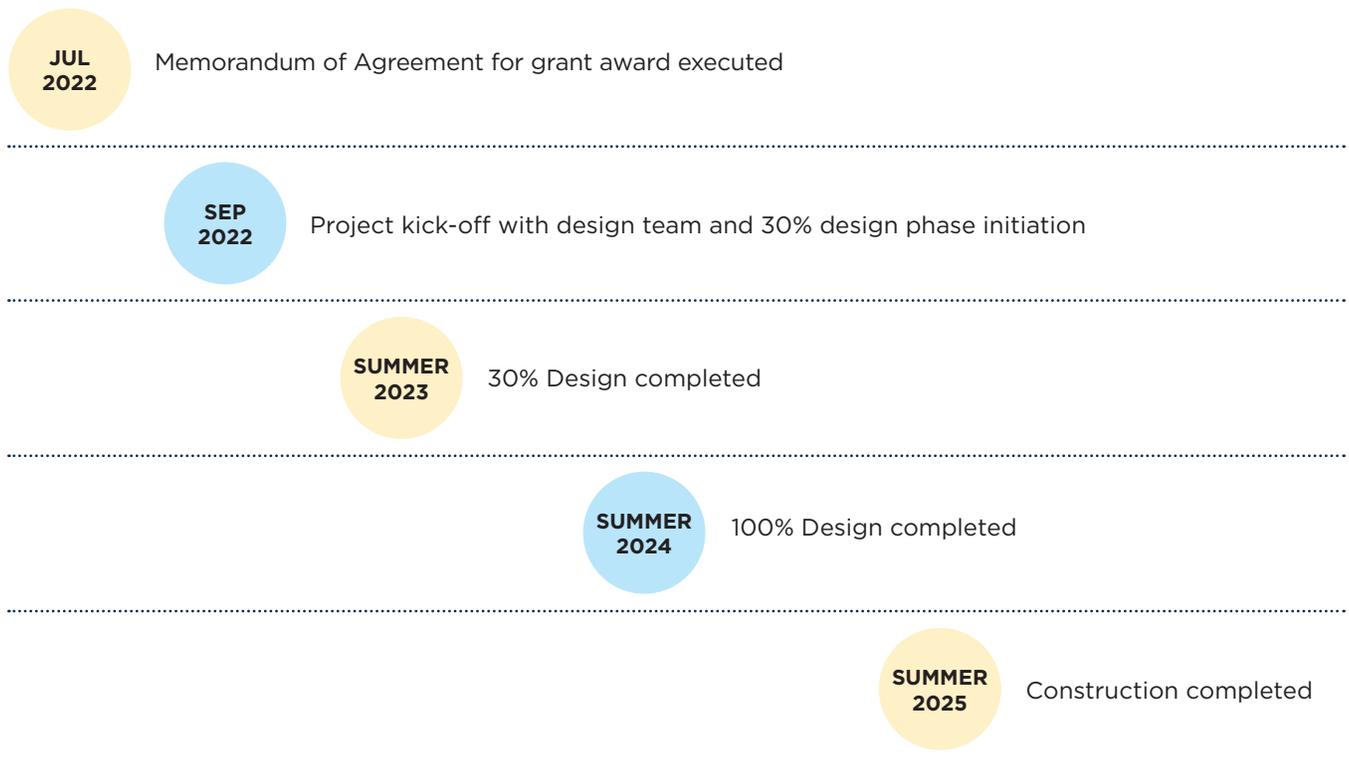
The Partnership's fundraising efforts have doubled MDOT MPA's initial seed funding, resulting in over \$4M in grants and donations since 2006 and over \$1M from new, more diverse funders in 2021-2022. Visitorship has increased, and partner-led programs (e.g., environmentally themed workshops, fishing/angler support, debris cleanups, pollinator garden plantings, community science events) are driving increased interest among federal, state, and local agencies, nonprofits and individuals wanting to connect with Masonville Cove.

### Improving Access: Masonville Cove Connector

As the first Urban Wildlife Refuge Partnership, Masonville Cove is well established as an educational and recreational community treasure, but access remains challenging. Consistent with its promise to restore access to the waterfront for the communities surrounding the Masonville DMCF, MDOT MPA and other partners have secured \$1.5M in funding from the Federal Highways Administration (FHWA) Federal Lands Access Program (FLAP) and USFWS to design and construct a shared use path connecting Masonville Cove to the Gwynns Falls Trail and adjacent communities, improving and increasing safe, equitable access to the site. A Memorandum of Agreement between partners was executed in 2022, and the design phase is underway. Once complete, the Masonville Cove Connector will serve as an important link in over 20 miles of walking and biking trails connecting dozens of neighborhoods, a regional hospital, and wellness facilities.

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### Masonville Cove Connector Milestones



## Poplar Island: A Model for Mid-Bay

The Paul S. Sarbanes Ecosystem Restoration Project at Poplar Island is world-renowned for its beneficial use of dredged material to restore remote island habitat helping to mitigate the effects of sea-level rise. Its lessons are already being incorporated into the planning and design of the Mid-Bay Project. Construction of the dikes for the Poplar Island Expansion project began in March 2017 and were completed in 2021, with inflow of dredged material into the area continuing this year. The expansion increased the placement capacity to 70 mcy and will add 575 new acres of restored wildlife habitat when completed, for a total of 1,715 restored acres.

The restored island is a popular stopover site for migratory birds along the Mid-Atlantic flyway and provides a home to a wide variety of other wildlife. Official 2022 bird censuses have identified 174 species, with 33 species confirmed as breeding onsite, including Northern Shovelers, which bred onsite for the fourth consecutive year providing only the fifth breeding record for Maryland, and Gadwall, which bred onsite for the second time.

### POPLAR ISLAND'S NEWEST RESIDENTS

Barn owls, listed as a State Rare Breeding species, have been observed intermittently on Poplar Island since 2010. However, for the first time, early this summer, an active nest was observed. An adult and five owlets were found nesting in an equipment shed. The owlets survived to fledge and were banded by the USFWS. To encourage future nesting away from construction equipment, the wildlife team will place owl nest boxes in the wetland cells far from the historic Least and Common Tern colonies, which are state listed as Threatened and Endangered species, and on which owls would naturally prey.

## Hart-Miller Island: A Haven for People and Wildlife

Hart-Miller Island (HMI) is a haven for boaters in the northern Chesapeake Bay, providing the public with recreational opportunities and exposure to many different species of plants, insects, and wildlife, including abundant migrating bird populations. Nearly 52,000 people visited in 2022 to fish, camp, boat, swim, bike, hike, and picnic. This year, 198 species of birds were observed on official censuses, with 19 species confirmed as breeding on site, including the second Maryland breeding record of Trumpeter Swan. Rare species observed included King Rail, Upland Sandpiper, Ruddy Turnstone, Wilson's Phalarope, American White Pelican, Alder Flycatcher, and Connecticut Warbler.

MDE recently recognized that the HMI South Cell is fully restored and functioning as wildlife habitat and therefore removed all monitoring requirements from the site's discharge permit. Meanwhile, a renewed 5-year HMI Interagency Agreement between DNR, MDOT MPA, and Maryland Environmental Service (MES) was executed. The South Cell will continue to be owned and operated as a state park by DNR; the North Cell is currently in the habitat development phase and will continue to be managed by MDOT MPA with assistance from MES. MDOT MPA and DNR finalized the conceptual restoration design for the North Cell and continue to work with the HMI Citizens Oversight Committee (HMI COC) to implement the long-term habitat development and management plan.

Since its initiation in 1985, the HMI COC has ensured an open dialogue between local communities and MDOT MPA and provided oversight on dredged material inflow and operations activities. Since inflow ceased at HMI in 2009, 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. The Friends group and their partners hosted the 3rd Annual Hart-Miller Island 5-Miler in October with 100 runners getting a unique opportunity to race around the island.

### Wolf Trap Alternate: Renewed Coordination and Deliberation

Maintenance material removed from the York Spit Channel, which serves both the Ports of Baltimore and Virginia, is placed every three to five years in Virginia’s Wolf Trap Alternate Open Water Placement Site (WTAPS) according to the Corps approved base plan and memorialized in a 1981 agreement between Maryland and Virginia. The Virginia Marine Resources Commission (VMRC) raised concerns regarding the protection of overwintering crab populations in WTAPS.

In response to these concerns, MDOT MPA, the Corps, and the VMRC created the Virginia Channels Bay Enhancement Working Group (VA BEWG), composed of scientific, regulatory, and technical managers. The VA BEWG has met regularly over the past two years and developed a shortlist of potential beneficial use projects, sites, and/or concepts that could serve as an alternative to open water placement at WTAPS. Viable solutions must be environmentally acceptable, cost-effective, and logistically efficient. The VA BEWG’s next step will be to pursue Corps Planning Assistance to the states’ study to refine the shortlist further.

### » Capacity Recovery and Long-Range Capacity Planning

Strategic capacity recovery and long-range capacity planning facilitate the Port’s DMMP by promoting consolidation, removing material from placement sites, or diverting dredged material from placement sites. Additionally, planning accounts for the possibility of changing dredging inflow demands due to the expansion of existing private terminals and potential future public and private marine terminals. External challenges include climate change and sea-level rise effects on dredging and placement capacity, permitting delays or obstacles, and procedural requirements.

20-YEAR DREDGING AND PLACEMENT PROJECTIONS (based on information available as of June 2022)			
Channel Segments	Dredging Needed	Remaining Placement Capacity	20 Year Capacity Deficit (-) or Surplus (+)
Baltimore Harbor Channels	27.0 mcy	26.7 mcy (with completion of Cox Creek Expanded, IRBU, and Masonville)	-0.3 mcy
Maryland Chesapeake Bay Approach Channels	40.3 mcy	118.2 mcy (Poplar Island and Mid- Bay)	+77 mcy
Virginia Chesapeake Bay Approach Channels	17.2 mcy	1,437 mcy	+1,419.8 mcy
C&D Canal and Approach Channels	12 mcy	16.5 mcy (Pearce Creek with dike raising)	+4.5 mcy

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 private sector new work dredging inflows. Through the 2027 fiscal year (FY), MDOT MPA can accommodate all anticipated Corps maintenance inflow as well as planned maintenance dredging projects for the private sector and the Seagirt Loop. MDOT MPA continues to work diligently to keep DMCF expansions on track, recover capacity, and pursue innovative and creative alternative dredged material management solutions.

These estimates show that the IRBU program will become instrumental in maximizing placement site capacity to 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. MDOT MPA will need to continue the planning process and accelerate material recovery schedules to have sufficient dredged material management capacity beyond 2042. Facilities must be carefully managed to maximize capacity, adhere to project construction schedules, and incorporate capacity recovery and dewatering strategies.

Once completed, Mid-Bay will accommodate an estimated 90 - 95 mcy of dredged sediment, providing placement capacity for more than 30 years.

## » Investing in Communities: Outreach & Education

MDOT MPA has long recognized that educating and collaborating with Marylanders is critical to the success of the Port and the DMMP and continues to invest in its diverse stakeholders. Throughout 2022, 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 & Universities (HBCUs), civic organizations, local faith-based congregations, and the use of new tools.

**The MDOT MPA is grateful for the support of the Harbor Team for the past twenty years and will continue to welcome their input as part of the Citizens Advisory Committee.**

### 20+ Years of Authentic Engagement

MDOT MPA has built a model engagement program to help people understand the importance of the Port and engage in initiatives that restore the environment and enhance the quality of life throughout our communities. MDOT MPA continues to make these educational opportunities widely accessible and to collaborate equitably with all Port stakeholders, ensuring that all affected constituencies are involved in planning and identifying effective dredged material management options.

Over 267 classrooms were engaged, of which:

**63%**

were Title 1 school classrooms (schools with high numbers or high percentages of children from low-income families)

**32%**

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)

Great strides in improving the accessibility and consumability of DMMP-related information were made in 2022, with the majority of committee meetings being held virtually or in a hybrid format. As the phased reopening of public spaces began, new state-compliant safety guidelines for providing public access to DMMP sites were developed, and outdoor activities and tours were hosted at Masonville Cove and other sites, including a fall open house at Cox Creek that attracted 120 attendees.

MDOT MPA's outreach and education programs provide widespread community engagement through meetings, project site tours, exhibits at community events, and onsite, in-classroom, and virtual environmental education. In 2022, these programs provided 12,000 engagements with adults and youth. Staff continued to adapt in-person lessons for virtual settings to provide innovative, dynamic educational opportunities, and new virtual resources were developed to enhance the education portal, which houses a library of digital educational materials.

### First Youth Birding Week

This summer, the Chesapeake Bay Trust sponsored the first Youth Birding Week with the Port, a program to educate urban youth as a pathway to career opportunities, including those in Science, Technology, Engineering, and Math (STEM) and maritime-related industries while increasing access to DMMP sites. Ten youth from the Baltimore area had the opportunity to spend a week learning the basics of birding and exploring Maryland's unique habitats created at the Port's DMCFs and restoration sites. The 7-11-year-olds started each morning at the Masonville Cove Environmental Education Center, traveling to learn about osprey and bird banding at Poplar Island, the diverse species of fish that birds rely on at Swan Creek at Cox Creek, and the unique birds nesting at HMI. They concluded their experience by presenting posters to their parents, who also participated in birding activities at Masonville Cove.

**“We’ve attended a LOT of nature and science focused camps and this was hands down the most outstanding EVER.”**

**— Deni Lyn Miller,  
parent of participant**

### Premiering the Spanish-Language Environmental Education Team

In June, educators conducted MDOT MPA's first bilingual program in English and Spanish entitled “Diamonds in the Bay” with Rock Creek Forest Elementary School Spanish Immersion Program students. The program provided information about the Port's operations, the beneficial use of dredged material in restoring Poplar Island, and the adaptations that help Poplar Island's beloved Diamondback Terrapins survive in the wild. By offering lessons in Spanish, MDOT MPA is working to increase accessibility and ensure every student has access to the important science education that MDOT MPA provides.

### Rooting for the TERPs

Poplar Island hosts a thriving Diamondback Terrapin population, with over 16,500 having hatched on site since 2002. The goal of the Terrapin Education and Research Partnership (TERP) is to further the study of terrapin biology and conservation in Maryland, 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

Over 850+ classes have released Head Start turtles at Poplar Island.

and the environment. TERP celebrated its 17th year and is the longest-running student-led K-12 turtle Head Start program known in the US. Partners include Anne Arundel County Public Schools, Calvert County Public Schools, Prince George's County Public Schools, the National Aquarium, and the newest partner, the University of Maryland College of Education. Poplar Island terrapins will be used as a teaching tool for pre-service teachers at the University of Maryland College of Education as they learn how to teach math and science, integrating local environmental contexts into K-12 STEM curriculum to support environmental literacy.

### Award-Winning Education Programming

During the COVID-19 pandemic, the Environmental Education Team developed the Environmental Education E-Learning (E3) Portal - [www.portofbaltimoreeducation.org](http://www.portofbaltimoreeducation.org) - for the Port of Baltimore as a platform to make lessons, programs, and activities more accessible to educators, students, parents, and the greater public. The E-3 Portal recently received national recognition with the Award of Overall Communications Excellence, the highest award in its category, from the American Association of Port Authorities (AAPA). MDOT MPA Executive Director Bill Doyle accepted the award at the AAPA Annual Convention in Orlando, Florida.

### Creating Career Opportunities

With the goal of creating pathways to valuable career opportunities, including those in STEM and maritime-related industries, MDOT MPA continued its workforce development efforts in collaboration with the Baltimore Port Alliance. The partnership executed two Hiring & Career Expos, bringing together nearly 70 employers and over 350 jobseekers.

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**“This was one of the best educational/professional experiences in my life.”**

**— 2022 Intern**

### Collegiate Collaborations

This summer, the Masonville Partnership hosted an Urban Conservation and Education Internship for five college students from HBCUs. Through this interdisciplinary program, the interns learned about all the Masonville Cove partner organizations, their roles in conservation and education efforts throughout the Chesapeake Bay watershed, and how they work together to promote conservation at Masonville Cove and within the city of Baltimore. The interns toured Poplar Island, visited the National Aquarium, met with the Brown Advisory Board, voyaged on the Mildred Belle, visited the Cox Creek DMCF, explored a bee lab at Patuxent Research Refuge, and served as mentors to students in the Living Classrooms Foundation's Baltimore Environmental Education Summer Math And Reading Trailblazers (BEESMART) program by helping the younger students set and work towards socioemotional or academic goals. The Keith Campbell Foundation, Brown Advisory, and Truman Semans funded the internship program.

## ► Our Vision for 2023

The culmination of years of investment, planning and expertise, inclusive partnerships, and a commitment to pursuing outcomes that equitably benefit all Marylanders have led to another very successful year for the MDOT MPA DMMP in 2022. 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**

1. Engage the Maryland Congressional Delegation, American Association of Port Authorities, and federal and state partners to ensure favorable legislation and sufficient funding for priority DMMP projects and the Corps navigation program.
2. Leverage partnerships with federal and state agencies and related collaborative efforts, including the Maryland Commission on Climate Change, to facilitate legislation and funding that support the DMMP and the Port in addressing climate change and resiliency planning.
3. Seek available state and federal funding for GHG emissions reductions, including Port electrification opportunities, to meet the new target of a 60% reduction by 2031 and net zero by 2045. Looking ahead, leverage ongoing carbon reduction programs and other environmental initiatives with additional opportunities to achieve environmental justice, equity, and diversity objectives.

### **Planning & Operations Recommendations**

1. Conduct capacity and demand planning beyond a 20-year timeframe to support long-term sustainable dredged material management options while achieving capacity recovery through the 2020 IRBU Strategy.
2. Begin to remediate the property adjacent to the Cox Creek DMCF to implement long-term, large-scale IR and capacity recovery efforts.
3. Incorporate the potential impacts of climate change and facilitate the use of nature-based and climate resilient solutions into long-term DMMP project planning, DMCF design and operations, and related project delivery while leveraging the best science available to quantify carbon sequestration benefits from the beneficial use of dredged material.
4. Conduct a second pilot CAD project to further evaluate the concept under different conditions and refine techniques for utilizing CAD as a Baltimore Harbor dredged material management solution.
5. Explore alternative funding and cost savings options to advance the habitat design and future management of HMI North Cell in partnership with DNR.
6. Engage the Corps, the Commonwealth of Virginia, resource agencies, and other stakeholders to refine the list of suitable, cost-effective dredged material placement options, including beneficial use opportunities, for the Virginia Channels.
7. Ensure that planning, design, and operational efforts related to DMMP infrastructure and restoration projects accelerate nature-based and climate resilient solutions, consider and incorporate the equitable distribution of benefits, and that any associated adverse impacts are not disproportionately borne by vulnerable communities.

### **Outreach & Education Recommendations**

1. Prioritize environmental justice by effectively engaging with stakeholders (in English and Spanish wherever possible) and increasing the public's knowledge about the Port of Baltimore in order to pursue outcomes that equitably benefit all Marylanders.
2. Recruit DMMP committee members that reflect the diversity of the communities adjacent to, and impacted by, the Port.
3. Create equitable access to DMMP sites to intentionally engage youth in educational programs as a pathway to thriving career opportunities, including those in STEM and maritime-related industries.

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## ► Building the Future Together

The future of the Port of Baltimore remains bright. Years of thoughtful planning, partnerships, and investment continue to foster success and demonstrate that the Port's economic vitality can drive economic health and benefit our communities and the environment. The infrastructure modernization undertaken by the Port reflects its commitment to maintaining Baltimore as a leading national port, and its innovative approach to new technology development, dredged material management, and expanded partnerships to drive education and access helps ensure these positive results will continue. MDOT MPA will continue to build the future, working closely with DMMP committee members, elected officials, community organizations, business partners, and other stakeholders.

## DMMP ANNUAL REPORT GLOSSARY OF ACRONYMS

Acronym	Meaning
AAPA	American Association of Port Authorities
BEESMART	Baltimore Environmental Education Summer Math And Reading Trailblazers
BPW	Board of Public Works
CAD	Confined Aquatic Disposal
CBF	Chesapeake Bay Foundation
CC COC	Cox Creek Citizens Oversight Committee
Corps	US Army Corps of Engineers
CSNA	Climate Solutions Now Act
DEUP	Diesel Equipment Upgrade Program
DMCF	Dredged Material Containment Facility
DMMP	Dredged Material Management Program
DNR	Department of Natural Resources
E3	Environmental Education E-Learning
EPA	Environmental Protection Agency
FHWA	Federal Highways Administration
FLAP	Federal Lands Access Program
FY	Fiscal Year
GHG	Green House Gas
HBCU	Historically Black College and University
HMI	Hart-Miller Island
HMI COC	Hart-Miller Island Citizens Oversight Committee
IR	Innovative Reuse
IRBU	Innovative Reuse and Beneficial Use

Acronym	Meaning
M	Million
MAEOE	Maryland Association for Environmental and Outdoor Education
MCCC	Maryland Commission on Climate Change
mcy	million cubic yards
MDE	Maryland Department of the Environment
MDOT MPA	Maryland Department of Transportation Maryland Port Administration
MES	Maryland Environmental Service
Mid-Bay Project	Mid-Chesapeake Bay Island Ecosystem Restoration Project
NOAA	National Oceanic and Atmospheric Administration
PAC	Ports America Chesapeake
Port	Port of Baltimore
STEM	Science Technology Engineering and Math
TERP	Terrapin Education and Research Partnership
TEUs	twenty-foot equivalent units
UMCES	University of Maryland Center for Environmental Science
USFWS	US Fish and Wildlife Service
VA BEWG	Virginia Channels Bay Enhancement Working Group
VMRC	Virginia Marine Resources Commission
WRDA	Water Resources Development Act
WTAPS	Wolf Trap Alternate Open Water Placement Site