

MDOT MPA Dredged Material Management Program

Annual Report 2021



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DREDGED
MATERIAL
MANAGEMENT
PROGRAM

2021

NEW ERA OF GROWTH AND SUCCESS

Q1
Jan-Mar

- Construction of Poplar Island Expansion was completed
- Cox Creek Expanded base dikes were widened to approximately 200' and a uniform elevation of +36'
- Ridgley's Cove, the largest innovative reuse demonstration project conducted to date, was completed
- 5-Year Hart-Miller Island Interagency Agreement between DNR, MDOT MPA, and MES was finalized, renewing each agency's role and responsibilities
- Spotlight Series webinars launched to better enable stakeholders to engage with the Port
- Baltimore Port Alliance hosted a Virtual Hiring & Career Expo

Q2
Apr-Jun

- Masonville DMCF Expansion funding restored
- Seagirt Berth 3 dredging completed
- Gwynnda: The Good Wheel of the West trash interceptor installed
- Barren Island Permit Application submitted

Q3
Jul-Sep

- U.S. Senate Appropriations Committee passed its version of the Energy & Water Development Appropriations Bill, which included \$37.5 million for the Mid-Bay project to clear the New Start designation hurdle and initiate construction
- Cox Creek Expansion +60' dike raising and expansion contract awarded and construction commenced
- Arrival of four additional ultra-large, Neo-Panamax cranes to Seagirt Marine Terminal
- Tested and implemented COVID-safe tours and events

Q4
Oct-Dec

- Masonville DMCF dike raising construction resumed
- Advertisement of public notice for Barren Island (Mid-Bay) permitting
- Mid-Bay community meeting held
- Launched Innovative Reuse and Beneficial Use website tool to provide a formal dredged material request process
- MD Board of Public Works approved 6th Innovative Reuse contract for research and development
- Seagirt Loop Feasibility Study expected to meet Tentatively Selected Plan Milestone
- Federal Lands Access Program Memorandum of Agreement is expected to be executed for the design and construction of a shared use path that links Masonville to the Gwynns Falls Trail and adjacent communities

► Reporting on 2021: Capitalizing on Investments

This report provides the Dredged Material Management Program (DMMP) Executive Committee with a concise overview of the Maryland Department of Transportation Maryland Port Administration's (MDOT MPA) long-term dredged material management plans, highlighting accomplishments for the year and providing recommendations for 2022. While some of the challenges of 2020 have carried over into 2021, the DMMP has continued to adapt and deliver on the mission to maintain the Port's 50-foot deep channel system and its commitment to science-informed decision-making, monitoring, stakeholder engagement, and communication.

Capitalizing on the substantial investments made over the past several years, a suite of multi-year planning efforts came to fruition this year with:

- > arrival of four additional ultra-large, Neo-Panamax cranes that will greatly boost container throughput capacity;
- > completion of dredging to deepen a second berth at the Seagirt Marine Terminal to 50-feet; and
- > receipt of final federal approval under the National Environmental Policy Act for the Howard Street Tunnel project.

The Port of Baltimore (Port) is one of a few East Coast ports with the ability to handle many of the world's largest vessels, and a second 50-foot-deep berth at Seagirt will allow two of these massive ships to be serviced at the same time. Complementing the improved Seagirt Berth are plans to expand Baltimore's Howard Street Tunnel, which will allow for the transit of double-stacked container rail cars out of the Port, clearing a longtime hurdle and giving the East Coast seamless double-stack capacity from Maine to Florida. These combined efforts will provide efficient and safe navigation, allow for double-stacked rail cargo, provide additional capacity and cargo handling capabilities to better accommodate ultra-large container vessels, and result in increased container capacity handling from the current 900,000 to 1,400,000 annually by 2027.

These results are an incredible testament to strategic long-term planning efforts, the relationships built over many years throughout the DMMP, and the importance of the program and its role in the Port of Baltimore's overall success. The program's strengths in strategic planning, proactive technical analysis, and overall resourcefulness were demonstrated through the ability to advance planned projects, restore project funding to construction projects, and pursue innovation, all while maintaining and leveraging its highly collaborative approach founded on robust stakeholder coordination and community engagement that leads to the identification and pursuit of mutually-beneficial outcomes.



» MDOT MPA's Mission

At the heart of the Office of Harbor Development's responsibilities lies MDOT MPA's mission to stimulate the flow of waterborne commerce through the ports in the State of Maryland in a manner that provides economic benefit to the citizens of the state. For twenty years, the DMMP has been providing a roadmap for these efforts, which includes improving and maintaining the navigation channels that serve the Port, promoting environmental stewardship to benefit the Chesapeake Bay, and driving outcomes that benefit the state economically, environmentally, and socially.

“The Port is continuing to show the power of its workforce and its infrastructure to fuel Maryland’s economy.”

MDOT Secretary, Greg Slater

Working collaboratively with stakeholders, the DMMP identifies cost-effective, innovative, and environmentally-friendly long-term placement and capacity solutions, from beneficial use to expansion of existing facilities, for the Port's 130+ mile channel system.

► Key Issues in 2021: Innovating, Investing, and Implementing

As one of the key drivers of Maryland's economic health, the Port plays an enormously important role in helping the state work towards recovery from the difficulties of 2020. Towards that end, regular maintenance dredging to keep the channel system open to the largest ships is paramount. Long-range capacity planning, site engineering, optimization of operations at dredged material placement sites, permit acquisition, and compliance are also vital to the successful operation of one of our state's most vibrant economic engines.

Still, key issues related to funding and policy, planning and operations, and outreach and education remain and new challenges have arisen.

» Funding & Policy

» Restored Funding for Expansion and Implementation

2020 presented unprecedented state budget challenges which required staff to work even more creatively, more collaboratively, and more strategically to deliver on MDOT MPA's mission while weathering severe funding constraints. To assure this funding, both at the state and federal levels, MDOT MPA emphasizes interagency policy coordination by regularly meeting with the Maryland Congressional delegation and other federal partners, while at the same time making every effort to contain costs, seek solutions to any foreseeable challenges, and manage long-term dredged material capacity needs.

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

Vertical and lateral expansion of the Cox Creek Dredged Material Containment Facility (DMCF) combined with the vertical expansion of the Masonville DMCF and capacity recovery efforts through Innovative Reuse (IR) of dredged material satisfies the 20-year plan for Harbor maintenance material and some new dredging projects (private sector new work material currently not accepted). MDOT MPA needs to meet its statutory mandate (Md. Code Ann., Envir. § 5-1104.2) to provide a rolling, long-term 20-year plan for dredged material management and adequate capacity to maintain the Port of Baltimore channels. To maintain continuity of operations and capacity planning, MDOT MPA worked to successfully restore State funding for the expansion of Masonville DMCF as Cox Creek DMCF Expansion construction continues.

Funding lows of 2020 rebounded such that several Harbor Development projects previously planned and paused were able to progress as partial State funding was restored and additional Federal funding was received. The U.S. Senate Appropriations Committee passed its version of the Energy & Water Development Appropriations Bill, which included \$37.5 million for the Mid-Chesapeake Bay Island Ecosystem Restoration (Mid-Bay) Project to clear the New Start designation hurdle and initiate construction on the project. Additionally, the Maryland Board of Public Works approved six IR contracts to support research and development of end use applications for dredged material.

» Planning & Operations

» Mid-Bay Islands: A Top Priority

The project presents a rare opportunity to restore remote island habitat and provide hundreds of acres of wetland and terrestrial habitat through the beneficial use of dredged material and MPA is working closely with other DMMP partners to ensure that all potential project benefits are being fully assessed. MDOT MPA's focus is on securing adequate federal and state funding for construction. Mid-Bay has consistently been identified as the Port of Baltimore's number one federal priority when briefing the Maryland Congressional

delegation, the US Army Corps of Engineers (Corps), the Assistant Secretary of the Army for Civil Works (ASA-CW), and the Office of Management and Budget. In August 2021, the U.S. Senate Appropriations Committee passed its version of the Federal Fiscal Year (FY) 2022 Energy & Water Development Appropriations Bill, which included \$37.5 million for the Mid-Bay project to clear the New Start designation hurdle and initiate construction on the project. MDOT MPA and the Corps are monitoring this legislation closely.

Restoration of Barren Island will not only protect the existing island, but will also stabilize nearby shorelines, reduce wave energy, and create critical wildlife habitat.

**MAY
2021**

Barren Island 35% design Permit Application submitted

**AUG
2021**

Mid-Bay Resiliency Working Group formed to focus on enhancing resiliency and addressing climate change impacts for the Mid-Bay project

**OCT
2021**

Public notice was issued for Barren Island Tidal Wetlands License and Water Quality Certification

**NOV
2021**

Public Comment period closed

**SEP
2022**

Construction to begin at Barren Island

2024

Construction to begin at James Island

Once Poplar Island reaches capacity in 2032/2033, Mid-Bay is the recommended plan to accept 2-3 million cubic yards (mcy) of annual maintenance dredged material from the Maryland Chesapeake Bay channel segments. Pre-construction engineering and design are currently underway. The first phase of construction at Barren Island is slated to begin in 2022 and James Island construction is expected to begin in 2024, with the expectation of the site being available to receive inflow starting in 2029, prior to Poplar Island reaching maximum capacity.

Remote island habitat is critical to bird breeding because predators are less common, allowing for greater nest success.

» **Deep-Water Loop at Seagirt**

The Seagirt Berth 3 dredging, which included a turning basin deepened to 50' to accommodate the safe navigation of Ultra Large Container Vessels coming into and out of the berths, was completed. This project also includes performing maintenance dredging of the channel leading up to the berth. Overall this project included approximately 500,000 cubic yards (cy) of dredging that was completed in time for the new cranes to be delivered to the Seagirt Marine Terminal in September.

MDOT MPA requested the Corps study deepening the entire Seagirt-Dundalk access channel system, allowing for ships to loop through a 50-foot deep channel and remove the inefficient need to back-up and turn around, and that the Corps maintain these improvements as part of the authorized Baltimore Harbor and Channels 50-foot MD & VA federal navigation project. The study assesses inefficiencies and safety concerns as vessels transit to the shallower 42-foot Seagirt Berths 1-2 while the deeper 50-foot Berths 3 and 4 are occupied with some of the world's largest vessels. The Seagirt Loop Feasibility Study and Berth 3 Improvements aim to relieve the terminal's berth capacity bottleneck, thereby increasing operational and commercial flexibility and enabling vessels to more efficiently move in and out of the terminal.

The Corps Baltimore District was awarded \$1.5 M in the Federal FY20 Work Plan to conduct the Feasibility Study, evaluating the need and justification for deepening the Seagirt Loop Channel. The Feasibility Study started in October 2020 and the Project Management Plan was finalized and approved on May 4, 2021. It is cost-shared 50/50 with MDOT MPA as the non-federal sponsor. The team is working towards the Tentatively Selected Plan Milestone which is anticipated to be completed in December 2021; the study is scheduled for completion by September 2023. Assuming the study justifies the project is in the federal interest, MDOT MPA will then work with federal partners to include it in subsequent Water Resources Development Act (WRDA) legislation and appropriations bills. The total construction is estimated at \$33M and would be executed with a 75% federal/25% state cost-share, resulting in an MDOT MPA contribution of approximately \$9M, however; costs will be refined as the study progresses.

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.

» **Achieving Major Innovative Reuse and Beneficial Use (IRBU) Milestones**

Roadmap to Innovation: In 2020, an updated IRBU Strategy was developed with input from both the Innovative Reuse and Management Committees and provides a clear framework for action. It includes detailed strategies related to the policy, regulatory, and technical aspects of the program, as well as expansion of education and stakeholder engagement efforts. The IRBU Strategy points the program in an ambitious, yet attainable, direction for implementing large-scale IR as the sustainable future for Harbor material capacity planning.

Implementation of the 2020 IRBU Strategy is underway with great milestones achieved in 2021. In response to a Request for Proposals (RFP) to support applied research & development projects to explore feasible reuse applications for Harbor dredged material, the Maryland Board of Public Works approved a series of contract awards that will allow MDOT MPA to identify critical steps to making large-scale innovative reuse a reality. There are six contracts underway, two with Certified Small Businesses and one with a Certified Minority Business Enterprise. Results from the first contract with Belden-Eco Products, LLC are anticipated in early 2022.

Building the IRBU Toolbox: The Innovative Reuse website tool launched in late 2021, helps capture and advance interest in using dredged material for alternative uses. The MD Department of the Environment (MDE) developed Confirmation of Suitability (CoS) forms as a tracking mechanism for the recycling and reuse of dredged material or fill. The CoS forms track reuse from the material supplier to the transporter, and finally to the interim receiving facility and/or the end-user. The CoS process is voluntary and best for large-scale reuse projects.

Making Innovative Use of Additional Property: MDOT MPA is currently in discussions with property owners to acquire property adjacent to the Cox Creek DMCF, for the primary purpose of furthering long-term capacity recovery efforts through large-scale IR of dredged material, as well as for future cargo terminal/maritime use. MPA is also putting every square acre of available property to productive use by exploring the potential for larger-scale IR efforts on the soon-to-be constructed North/South cross dike at the Cox Creek and the Kurt Iron Slip at the Masonville DMCF.

Property acquisition and the large-scale IR activities anticipated to take place there are necessary for continuing the strategic planning for long-term dredged material management capacity and facilitating Port growth opportunities. IR is needed to optimize the life of both the Cox Creek and Masonville DMCFs.

	Company	To study and demonstrate the feasibility of using dredged material from:
1	Belden-Eco Products, LLC	Cox Creek DMCF in ceramic bricks and permeable pavers
2	Northgate Environmental Management, Inc	Cox Creek DMCF in the development of concrete traffic barriers and shoreline protection structures
3	FasTrak Express, Inc	Cox Creek DMCF in the development of re-engineered soil for growing sod
4	Harford Industrial Minerals, Inc.	Cox Creek DMCF in the production of lightweight aggregate
5	Susquehanna Concrete Products, Inc. (Suscon Products)	Cox Creek DMCF in various concrete mix designs for the production of general use concrete products
6	CSI Environmental, LLC	Masonville DMCF to develop upland and shoreline berms using geotextile tubes

Innovative Investigations: MDOT MPA is partnering with the University of Maryland Center for Environmental Science (UMCES) and private sector partners to investigate the addition of recycled glass cullet as a stabilizing amendment to Baltimore Harbor channel maintenance dredged material for potential use in nearby shoreline restoration efforts. MDOT MPA, along with the Corps, generates approximately 1.5 mcy of Harbor channel dredged material per year and is looking for means to beneficially use the material with an eye towards strategic planning, climate resilience, and sustainable infrastructure. Concurrently, the Baltimore City Department of Public Works generates approximately 55,000 tons of glass a year with no viable market for recycling and reuse. One of the main limitations for the use of dredged material from the Harbor Channels in shoreline restoration is that it is commonly fine-grained and highly erodible. Typically, coarse sand has been employed to stabilize dredged sediment; however sand is becoming scarcer and more expensive. A possible means of improving the utility of dredged material is to amend it with recycled inert glass cullet, which when ground sufficiently bears similar properties to coarse sand. Biohabitats has teamed with OLIN Labs to partner on the study to investigate the feasibility of applying glass cullet for this application. The objective of the study is to blend two local and available recyclable materials, glass-sand and dredged material, to create a viable substrate for restoring shorelines and increasing the resiliency of urban waterfronts.

Taking Steps to Address Climate Resilience: MDOT MPA is working with local, state, and federal partners to research, plan for, and implement sound climate resilience and adaptation policies and projects. Advancements continue under the IRBU Strategy which calls for MDOT MPA to “Investigate how beneficial use of dredged material can be expanded to address Maryland’s Coastal Resiliency needs” by addressing policy, regulatory and technical issues, implementing programs and projects, and enhancing education and stakeholder engagement opportunities. Beneficial use of dredged material in the face of climate change is one important tool in this effort, as these projects provide sediment to build more resilient shorelines and habitats while also solving for capacity constraints at DMCFs. Collaboration will be critical, beyond just the work of the DMMP. MDOT MPA is an active participant in the Maryland Commission on Climate Change (MCCC) and continues to work closely with MDOT, MDE, Maryland Department of Natural Resources (DNR), UMCES, and other partners to identify opportunities to proactively plan and implement preventive measures to address climate change impacts.

Current specific efforts include:

Mid-Bay encompasses the islands of James and Barren in western Dorchester County and is focused on restoring remote island habitat to provide hundreds of acres of wetland and terrestrial habitat through the beneficial use of dredged material. The restored islands will act as a buffer against land loss by reducing wave heights to protect waterfront communities on the adjacent Eastern Shore, whose banks have been steadily eroding. The Mid-Bay project will restore approximately 2,144 acres of remote island habitat, including 1,212 acres of tidal wetlands. In addition, this restoration will protect existing Island remnant habitats while also protecting existing seagrass beds and promoting their future growth.

In 2021, a Mid-Bay Resiliency Working Group was created to identify, evaluate, and recommend design and habitat features that address resiliency, vulnerability, carbon sequestration, and mitigating for climate change associated with the Mid-Bay Project. The Mid-Bay Resiliency Working Group was born out of discussions that occurred at the DMMP Management Committee regarding incorporating resiliency into the project design with initial participation from MDE, DNR, UMCES, Corps, MDOT MPA, and MDOT to discuss each agency’s focus on climate change and resiliency. The Working Group’s goal is to review existing project information for potential opportunities and constraints related to the Mid-Bay Project for incorporating and strengthening resiliency design and habitat features. The Working Group will establish a Mid-Bay Resiliency/Sustainability Features Documentation Framework to compile effective climate resilient restoration projects and design features based on collaboration with subject matter experts to ensure information sharing of relevant resources such as research, case studies, current technologies, and data, and develop and populate a decision-making matrix for the evaluation of identified options/features based on engineering feasibility, cost-benefit analysis, long term gain/maintenance, and several other factors.

In 2019, a local community partner, the Turner Station Conservation Teams, was awarded an MDOT Secretary's Grant of \$500,000 to support the Fleming Park Restoration Project which involves the revitalization of a recreational asset in Baltimore County by using dredged material in both upland and in-water applications. This project will be a showcase for beneficially using Harbor channel dredged material in the Baltimore Harbor area to address coastal resiliency challenges such as the impacts of erosion, flooding, and inundation from rising sea levels. Refined conceptual design and engineering plans for this project will be complete by the end of the year.

MDOT MPA continues to share relevant scientific data with the MCCC and UMCES, including specific information related to carbon sequestration in marshes on Poplar Island. This information could play a part in the International Blue Carbon Initiative, a coordinated, global program focused on mitigating climate change through the conservation and restoration of coastal and marine ecosystems.

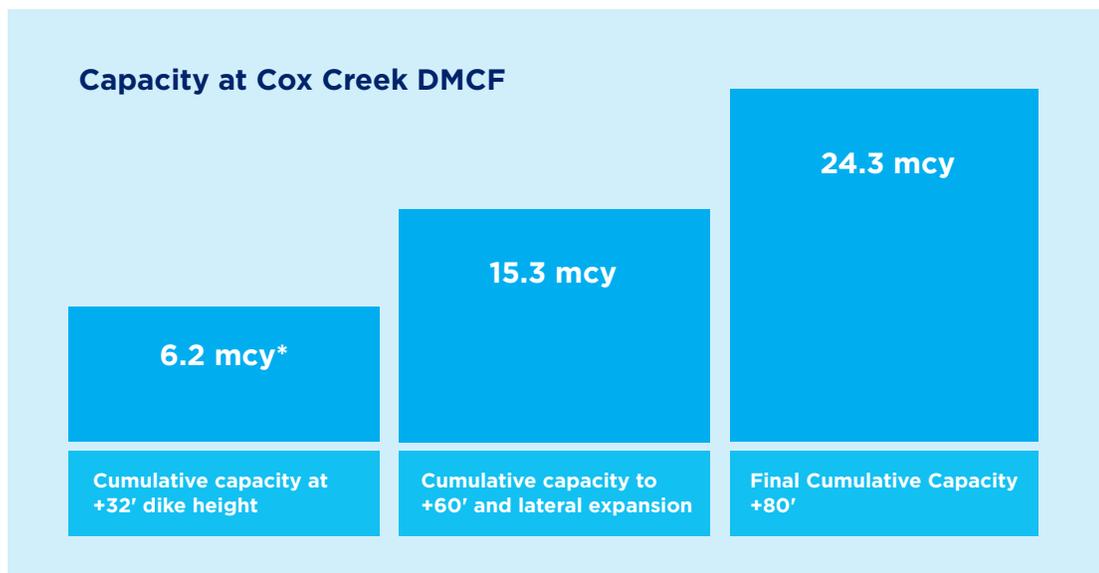
There is much to be learned from the application of dredged material to address coastal resilience. The challenge will be doing it cost-effectively. MDOT MPA is committed to exploring innovative and alternative funding sources and partnerships to continue this work.

» Dredged Material Management

DMCF operations continued throughout 2021 with minimal impacts from COVID-19. Harbor dredging projects including 50-foot channel maintenance, Seagirt Berth 3 deepening and maintenance, South Locust Point Berths, Amports, National Gypsum, and Colgate Creek maintenance have led to inflow at the Masonville and Cox Creek DMCFs. These two sites, working together as a system, can accommodate the current Harbor maintenance dredging demands efficiently and effectively while managing water discharge and performing crust management. It is imperative that not only both the Masonville and Cox Creek expansion projects advance on schedule but that operations at each site allow for maximum capacity in order for MDOT MPA to meet the annual Harbor-area maintenance dredging demands from both the Corps and MDOT MPA and private sector partners.

**196 species of birds
have been observed
during official censuses,
birding tours, and routine
sightings by staff,
with confirmed breeding
of 29 species on site.**

Cox Creek Expanded: MDOT MPA is on schedule with the Cox Creek DMCF Expansion by vertically raising the dikes and building onto the MDOT MPA-owned upland property, as recommended by the Harbor Team in 2011. Cox Creek DMCF dikes were widened to approximately 200' at a uniform elevation of +36' using material reclaimed from the Cox Creek property. This built the foundation needed to raise the dikes to +60', which began this summer and will be completed in 2024. All permits and

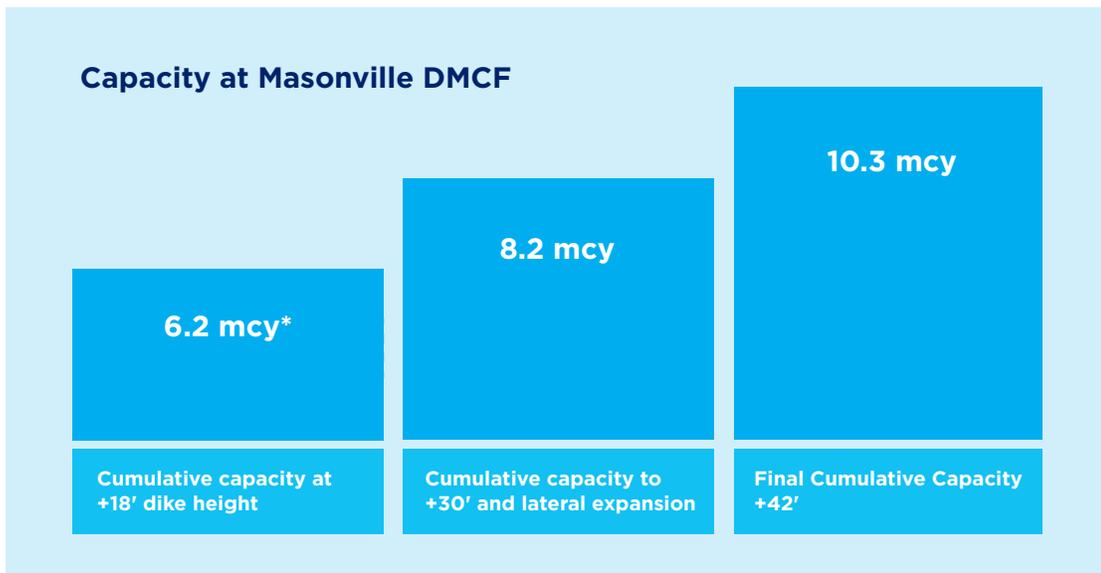


authorizations for the project have been obtained. Inflows are occurring during construction. Once complete, the +60' Dike Raising Project will provide 8.8 mcy of additional capacity for a total of 15.3 mcy.

The Cox Creek Citizens Oversight Committee (CC COC) continues to provide input and feedback to MDOT MPA regarding the operation of the facility and recommendations on minimizing the potential impacts it may have on the nearby communities and natural resources in the area. Work is ongoing with the CC COC regarding required regulatory mitigation and community enhancements including reserving 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. Once a cost estimate for the required regulatory mitigation is finalized, MDOT MPA will evaluate the feasibility of moving forward with additional enhancements.

Masonville DMCF Expanded: The first lift of dike raising (+18') was completed in April 2020, bringing the cumulative capacity of the site to 6.2 mcy. With partially restored funding, construction is moving forward on the second lift of dike raising (+30') which resumed in late 2021 and includes base dike widening, design, and permitting for dike raising to +30'. Pending the availability of funding, this will be followed by design/permitting for dike raising to +42' with anticipated completion in 2029. All on-site and off-site mitigation projects for the construction of the Masonville DMCF are complete, culminating with the installation of a fourth trash interceptor at Gwynns Falls in partnership with the Waterfront Partnership of Baltimore.

Indoor and outdoor COVID-safe programs were hosted along with virtual programming for students, resulting in 2,300 engagements.



At the adjacent and flourishing Masonville Cove campus, this once neglected and contaminated dumping ground is now home to over 300 species of birds and animals. Official wildlife censuses include 169 bird species observed on site, with 28 species confirmed as breeding. The campus will be entered into a conservation easement held jointly by Maryland Environmental Trust and Baltimore Green Space, a local land trust, to preserve the area as a natural environment.

In 2021 the campus saw a record number of visitors, nearly 2,000, which represents an almost 50% increase over last year, including 45% of whom were visiting the site for the first time.

On average, 25% of visitors to the campus come from neighboring communities, which is an intentional focus of the Masonville Cove Partnership. The Partnership organizations (MDOT MPA, Living Classrooms Foundation, National Aquarium, and U. S. Fish and Wildlife Service) each provide numerous opportunities and environmental education programs that allow neighbors and students to interact with wildlife and the natural environment. The Partnership is dedicated to inspiring all people to explore, discover, and respect nature, growing the next generation of environmental stewards. Implementation of its strategic plan in 2021 established the goal of becoming a national leader in urban conservation known for superior educational programs and identified as a community asset and recreation destination where everyone has equal opportunity to benefit from meaningful outdoor and stewardship experiences.

Gwynnda: The Good Wheel of the West became operational in July 2021 and has since removed 134 tons of trash and debris.

Like so many other cities in the United States, Baltimore's social, environmental, and economic justice issues are front and center, and Masonville Cove provides an ideal platform for the Partnership to address systemic inequities including environmental degradation by improving the environment through restoration and protection. The Partnership is working to foster a sense of belonging in nature by creating meaningful connections for visitors as well as dismantling

barriers to access via inclusive and responsive programming, providing rideshare programs, and creating a shared use path to improve physical access to the site.

In 2020, the Masonville Cove Shared Use Path was selected as one of two Federal Lands Access Program (FLAP) projects funded in Maryland. This project includes the design and construction of a path that links Masonville to the Gwynns Falls Trail and adjacent communities. The current project initiation phase includes stakeholder engagement and coordination to stay abreast of adjacent and related access improvement projects, both current and future. The Memorandum of Agreement between MDOT MPA, Federal Highway Administration, National Park Service, and U.S. Fish and Wildlife Service is expected to be executed in 2021 and the design phase is slated to begin in 2022.

Bald eagles bred successfully for the past 3 years rearing a total of 7 eaglets to date.

An adult tern banded on Poplar Island in 2017 traveled over 1,850 miles to Aruba, where it was photographed by a local naturalist

Poplar Island: A Model for Mid-Bay: The Paul S. Sarbanes Ecosystem Restoration Project at Poplar Island is world-renowned for the beneficial use of dredged material restoring important, scarce remote island habitat with the potential to mitigate the effects of sea-level rise. Construction of the dikes for the Poplar Island Expansion project were completed, which increases the placement capacity to 70 mcy, and will add 575 new acres of restored wildlife habitat when filled for a total of 1,715 restored acres. Expansion activities began in March 2017 and the dikes were completed in 2021, with the first inflow into the expanded area also taking place this year.

The restored island is a popular stopover site along the mid-Atlantic flyway for migratory birds and provides a home to a wide variety of other wildlife. Official 2021 bird censuses have identified 177 species observed, with 40 species confirmed as breeding onsite. Northern Shovelers bred onsite for the third consecutive year and are only the fourth breeding record for Maryland. Gadwall, Carolina Wren, and Brown Thrasher bred onsite for the first time this year. Poplar Island also hosts a thriving Diamondback Terrapin population, with as many as 1,600 terrapins hatched onsite in a single year. 2021 was a very successful year for tern nesting in targeted habitat, with approximately 100 nests.

Wolf Trap Alternate: Renewed Coordination & Deliberation with Virginia: Concerns were raised by the Virginia Marine Resources Commission (VMRC) regarding the protection of overwintering crab populations in Virginia's open water placement site, Wolf Trap Alternate Open Water Placement Site (WTAPS). Maintenance material removed from the York Spit

Channel, which serves the Port of Baltimore, as well as the Port of Virginia, is placed every three to five years in WTAPS, which is the federal standard, or base plan, as approved by the Corps and memorialized in a 1981 agreement between Maryland and Virginia. VMRC recommended the use of an extension of the existing WTAPS site to the north for this most recent dredging cycle of the York Spit Channel. This placement option resulted in increased transportation costs, which were required to be borne by MDOT MPA as the non-federal sponsor since the WTAPS northern extension is not currently part of the Corps' base plan.

MDOT MPA, the Corps, and VMRC are actively coordinating a workgroup with scientific, regulatory, and technical managers to identify, rank, and recommend potential alternative solutions for placement of dredged material in the Commonwealth of Virginia from the Virginia Chesapeake Bay Approach Channels subset of the Baltimore Harbor and Channels Civil Works Project. Viable solutions must be environmentally acceptable, cost-effective, and logistically efficient. Determination on an agreed-upon, recommended solution or placement site for further evaluation is the workgroup's goal in advance of the next York Spit channel dredging cycle, anticipated to be needed in the next 1-3 years, although the necessary environmental approvals and documentation may not be complete by that time.

Hart-Miller Island: 40 Years Later: Hart-Miller Island (HMI) has become a haven for boaters 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. Throughout this year nearly 82,000 people visited to camp, boat, swim, bike, or hike. DNR owns the island and manages seasonal recreational activities offered in the South Cell. Upon restoration of the North Cell, the entire site will be managed by DNR as a state park. The HMI Citizens Oversight Committee (HMI COC), created by the General Assembly forty years ago, has ensured open dialogue between the communities surrounding the site 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 Hart-Miller Island State Park volunteer group.

MDOT MPA and DNR finalized the conceptual restoration design for the North Cell and continue to work with the HMI COC to implement the long-term North Cell habitat development and management plan. Thirty-five years of exterior monitoring showed that there have been no significant adverse effects to surrounding waters connected to HMI operations. As a result, the principal investigators deemed it reasonable to discontinue exterior monitoring. MDE recognized that the South Cell is fully restored and functioning as wildlife habitat, and therefore removed all monitoring requirements from the site's discharge permit. A total of 194 species of birds have been observed on official censuses, with 20 species confirmed as breeding onsite including the first Maryland breeding record of Trumpeter Swan. Rarities included Surf Scoter, King Rail, Black-necked Stilt, American Avocet, American Golden-Plover, Ruddy Turnstone, Baird's Sandpiper, Buff-breasted Sandpiper, Western Sandpiper, Long-billed Dowitcher, Black Tern, American White Pelican, Short-eared Owl, and Saltmarsh Sparrow.

A 5-Year Hart-Miller Island Interagency Agreement between DNR, MDOT MPA, and MD Environmental Service (MES) was finalized. It renews each agency's role and responsibilities for continuing cost-effective operations in the South Cell, owned and operated as a state park by DNR, and the North Cell, currently in the habitat development phase and managed by MDOT MPA with assistance from MES.

Capacity Planning for the Long Run: With so much at stake, and any delay in expansion resulting in real impacts to placement capacity, strategic capacity planning is imperative; the DMMP must take into consideration the full suite of possible challenges and potential solutions. External challenges include the effects of climate change and sea-level rise on dredging and placement capacity, property acquisition, funding challenges, permitting delays or obstacles, procedural requirements, and others. 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.

Bay Channels: With Poplar Island reaching capacity by 2032/2033, securing adequate and timely funding to bring Mid-Bay into operation no later than 2029 is critical. Without it, the Port's 50' channel segments will quickly shoal, jeopardizing businesses that rely on the 50' channel system and putting the health of the Port, and all of its economic advantages, at risk. Once completed, Mid-Bay will accommodate an estimated 90 - 95 mcy of dredged sediment, providing placement capacity for more than 30 years.

Planning Estimates (mcy) as June 30, 2021				
Channel Segments	Average Annual Demand	20 Year Demand	Available / Planned Capacity Supply	20 year Capacity Deficit (-) or Surplus (+)
Harbor	1.33	26.6	27.3	+0.7
MD Bay	2.0	38.3	120.2	+81.9
C&D Approaches	0.6	12.0	16.6	+4.6
VA Bay	0.9	17.9	>157	+>139.3
Total	4.83	94.8	>321.1+	+226.5

Harbor Channels: There are near-term pinch points in the current 20-year capacity plan for material removed from the Baltimore Harbor channel segments prior to the capacity for Cox Creek Expansion coming online. The 20-year plan is constrained, resulting in an ongoing moratorium on private sector new work dredging inflows. Through FY 27 MDOT MPA can accommodate all anticipated Corps maintenance inflow as well as planned private sector maintenance dredging projects and the Seagirt Loop (pending completion of the Feasibility Study). MDOT MPA continues to work diligently to keep DMCF expansions on track, recover capacity, and pursue innovative, creative alternative dredged material management solutions.

Confined Aquatic Disposal: MDOT MPA completed monitoring the Confined Aquatic Disposal (CAD) pilot project in 2019 and has been working to evaluate the lessons learned from the pilot to determine the next steps for the program. Planning and site investigation studies are underway for CAD within Baltimore Harbor to inform location siting for the next pilot cell.

» Outreach & Education

Educating Marylanders about the Port is critical to the success of the DMMP. In 2021, MDOT MPA was able to effectively engage with a widening diversity of stakeholders both virtually and in person. Comprehensive outreach and education programs have been accomplished through a combination of the formal DMMP committee structure, supported by both adult and student-focused education programs and stakeholder partnerships. During the pandemic, many people sought refuge in the outdoors, some for the first time. These new outdoor enthusiasts represent an opportunity to grow and diversify the visitors to Port facilities and teach more people about the Port of Baltimore, the dredging program, and their importance to the State of Maryland. Stakeholder engagement and education programming expanded to new platforms and relationships were forged with new partners including local Historically Black Colleges & Universities, civic organizations, and local faith-based congregations.

» A Helpful Hybrid

MDOT MPA has built a model outreach program to help people understand the importance of the Port of Baltimore and engage in initiatives that restore the environment and enhance the quality of life throughout our communities. MDOT MPA continually strives to make these educational opportunities widely accessible and to collaborate equitably with all Port stakeholders.

With the arrival of the pandemic, the program's site tours and in-person meetings successfully pivoted to virtual engagement. MDOT MPA transferred materials to an all-digital format and transitioned many meetings to a virtual platform, with a surprising increase in both attendance and participation by the DMMP Committee members. Not stopping there, MDOT MPA created new digital assets like videos and virtual tours, maintained close coordination with existing partners, and established new partnerships in this changing environment. The majority of the 2021 DMMP meetings were held virtually, and a new webinar series enabled nearly 400 engagements with stakeholders who learned about climate resiliency, the Mid-Bay Project, and

Port environmental initiatives. Great strides in improving the accessibility and consumability of DMMP-related information were made in 2021, with more innovations to come in 2022.

As the phased reopening of public spaces began, new guidelines for providing public access to DMMP sites were developed to adhere to all state-mandated safety protocols. Outdoor activities and tours were hosted, and protocols tested. A suite of successful outdoor activities was hosted at Masonville Cove, and a fall Open House at Cox Creek attracted over 100 attendees. Three MDOT MPA sites

were featured in the National Audubon Society Baltimore Birding weekend that resulted in a stunning 138 bird species observed across the city, a remarkable diversity during fall migration.

Maryland Geocaching Society's annual Cache Across Maryland attracted more than 200 visitors to Masonville Cove.

» Educate and Engage

MDOT MPA's outreach and education programs provide community engagement through meetings, project site tours, and onsite, in-classroom, and virtual environmental education, and exhibiting at community festivals and events. In 2021, these programs provided 8,000 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. Over 130 classrooms were engaged this year, of which 37% 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) and 69% were Title 1 School Classrooms (schools with high numbers or high percentages of children from low-income families).

Rooting For The Terps: The Terrapin Education and Research Partnership (TERP) celebrated its 16th year. Partners include Anne Arundel County Public Schools, National Aquarium, Calvert County Public Schools, and the newest partner, William S. Schmidt Center at Prince George's County Public Schools. To date, over 2,800 terrapins have been given a head-start by students, and more than 750 classes from schools around the state have released head-start turtles since the program began. While schools were closed due to COVID-19, staff found creative ways to bring terrapin education to learners across Maryland. Terrapins joined video calls to teach students about adaptations, and staff transported students virtually to Poplar Island through digital field trips featuring live video and unscripted nature encounters.

Baltimore Port Alliance Brings People Together: MDOT MPA continued productive collaboration with Port stakeholders through the Baltimore Port Alliance by supporting a Virtual Hiring & Career Expo in March, bringing together 29 employers and over 275 job-seekers.

» Collegiate Collaborations

University of Maryland Global Campus: MDOT MPA is working with graduate students from the University of Maryland Global Campus's Environmental Science and Management program on a capstone project focused on the current state of practice surrounding the use of renewable/zero-emission technologies to help meet the Port's net-zero emissions goal, including citing standards and best practices for the potential use of solar power at MDOT MPA facilities.

Morgan State University: The Morgan State University School of Architecture and Planning and UMCES Chesapeake Biological Laboratory are working in coordination with MDOT MPA on a planning and design study of the Masonville Cove Urban Wildlife Refuge Partnership. This study aims to enhance access for city residents and better leverage existing programs and partnerships in the landscape design of the 54-acre campus. Using design, placemaking strategies, and linkages to places and infrastructure beyond the Cove, it will consider ways to improve campus vitality and increase visitation while raising the prominence of the Cove's existing and future programs. The study will pay particular attention to making the Cove more accessible and inviting to the residents of Baltimore's nearby Middle Branch waterfront neighborhoods. The neighborhoods closest to the Cove are predominantly lower-income and residents of these neighborhoods have substantially higher rates of disease and lower life expectancy than the city and state as a whole; these are precisely the people who will benefit the most from enhanced access to the water's edge, increased recreational opportunities, and improved linkages to the region's system of trails and pedestrian-bike infrastructure.

Coppin State University: A new partnership was debuted with the Harbor City Links' Scholars Program, a mentoring program working closely with students attending Coppin State University, ensuring the students are academically successful. This mentorship program encourages engagement with nature through programs at Masonville Cove with a deep dive into community engagement and greening projects while providing Coppin State students the connectivity to environmental careers and career pathways.

► Recommendations for 2022

The culmination of years of planning and expertise, inclusive partnerships, science-informed decision making, and a commitment to pursuing outcomes that equitably benefit all Marylanders has led to a very successful year of project implementation for the DMMP in 2021. MDOT MPA is preparing for the arrival of 2022 with optimism and resolve to continue to exceed expectations. We put forward these recommendations, determined to usher the Port of Baltimore into a period of success that will benefit our region economically, environmentally, and socially for decades to come.

Funding & Policy Recommendations

1. Engage the Congressional delegation, as well as federal and state partners, to support sufficient funding via WRDA legislation and appropriations bills for priority DMMP projects; prioritize Mid-Bay, Seagirt Loop Improvements, and maintenance by the Corps as part of the authorized Baltimore Harbor and Channels 50-foot Maryland & Virginia federal navigation project and Intracoastal Waterway, Delaware River to Chesapeake Bay, Delaware & Maryland federal navigation project.
2. Work in coordination with the American Association of Port Authorities to ensure favorable legislation and funding for the Corps navigation program and projects that benefit Port channels, while coordinating with the Ports Climate Program to favorably position the Port of Baltimore in new legislation related to resiliency and climate change.
3. Leverage partnerships and collaborations with sister state agencies and related collaborative efforts such as the Maryland Commission on Climate Change to ensure the DMMP evaluates external risks, maximizes opportunities, and successfully adapts to changing circumstances while accounting for Port growth, dredging needs, and climate change.

Planning & Operations Recommendations

1. Conduct capacity and demand planning beyond a 20-year timeframe to support long-term sustainable dredged material management options while considering capacity recovery from Innovative Reuse and Beneficial Use.
2. Continue to implement the 2020 Innovative Reuse and Beneficial Use Strategy and pursue the acquisition of the Tronox property for implementation of long-term, large-scale Innovative Reuse and capacity recovery efforts.
3. Incorporate the potential impacts resulting from climate change into DMMP project planning, DMCF design, and project implementation while leveraging the best science available to quantify carbon sequestration benefits from the beneficial use of dredged material.
4. Support the efforts of the Mid-Bay Resiliency workgroup.
5. Advance MDOT MPA Critical Project priorities:
 - a: Mid-Chesapeake Bay Island Ecosystem Restoration Project
 - b: Expansion of Cox Creek and Masonville DMCFs
 - c: Seagirt Marine Terminal Loop Study

6. Evaluate future alternative management solutions such as CAD in Baltimore Harbor.
7. Explore alternative funding to advance the habitat design and future management of Hart-Miller Island in partnership with DNR.
8. Engage the Corps, Commonwealth of Virginia, resource agencies, and other stakeholders to identify suitable, cost effective dredged material placement options for the Virginia Channels.

Outreach & Education Recommendations

1. Adapt outreach and education programs to align with COVID requirements and promote the inclusive and meaningful involvement of all people in the implementation of the DMMP by effectively educating and engaging all stakeholders equitably to increase the public's knowledge of the Port of Baltimore and dredging program, and their importance to the State of Maryland.
2. Engage stakeholders and recruit DMMP committee members that reflect the diversity of the communities adjacent to, and impacted by the Port of Baltimore, and ensure the benefits of MDOT MPA restoration projects and programs are distributed equitably without disproportionate impacts on vulnerable populations.
3. Create equitable access to DMMP sites to intentionally engage urban youth in targeted environmental programs as a pathway to careers in STEM and the maritime industry.

► Emerging Even Stronger

Emerging from pandemic-related impacts, the DMMP has proven adaptable and resilient, maintaining the Port's channels and overall progress on the 20-year plan while also honoring its commitments to our community partners and environment. Port Commissioners, elected officials, DMMP committee members, MDOT MPA staff, and many other stakeholders have worked to ensure the progress and acceleration of our innovative projects and programs. The Management Committee is confident that continued strategic planning, scenario analysis, and expanded collaboration will enable MDOT MPA and the State of Maryland to meet each challenge head-on and drive even more versatile results and shared successes in 2022.

DMMP ANNUAL REPORT GLOSSARY OF ACRONYMS

Acronym	Meaning	Page
ASA-CW	Assistant Secretary of the Army for Civil Works	8
CAD	Confined Aquatic Disposal	19
CC COC	Cox Creek Citizens Oversight Committee	14
CoS	Confirmation of Suitability	10
COVID-19	Coronavirus Disease 2019	20
cy	cubic yards	9
DMCF	Dredged Material Containment Facility	7
DMMP	Dredged Material Management Program	4
DNR	Department of Natural Resources	12
FLAP	Federal Lands Access Program	16
FY	Fiscal Year	8
HMI	Hart-Miller Island	17
HMI COC	Hart-Miller Island Citizens Oversight Committee	17
IR	Innovative Reuse	7
IRBU	Innovative Reuse and Beneficial Use	10
MAEOE	Maryland Association for Environmental and Outdoor Education	20
MCCC	Maryland Commission on Climate Change	12
mcy	million cubic yards	9
MDE	Maryland Department of the Environment	10
MDOT MPA	Maryland Department of Transportation Maryland Port Administration	4
MES	Maryland Environmental Service	18
RFP	Request for Proposals	10
TERP	Terrapin Education and Research Partnership	20
UMCES	University of Maryland Center for Environmental Science	11
VMRC	Virginia Marine Resources Commission	16
WRDA	Water Resources Development Act	9
WTAPS	Wolf Trap Alternate Open Water Placement Site	16