Financing and Funding Tidal Wetland Restoration in the Chesapeake Bay

Executive Summary

October 31, 2025

This Executive Summary synthesizes the findings and recommendations from the research conducted by the Environmental Policy Innovation Center (EPIC) under contract with the Chesapeake Bay Trust[1], focusing on innovative funding and financing mechanisms for tidal wetland restoration across the Chesapeake Bay tidal jurisdictions (Maryland, Virginia, Delaware, and the District of Columbia).

Background

The Chesapeake Bay is the largest estuary in the United States and the third largest in the world. The Bay historically had 3 million acres of wetlands; this has declined by 1.5 million acres, or about half.[2] Tidal wetlands currently cover about 284,000 acres. Further projected declines mean that the Bay's tidal wetlands are in danger of being lost: tidal wetland loss projections range from 50% by 2100 to nearly 90% by 2080.[3] These losses are driven primarily by sea-level rise, which is happening more rapidly in the Bay than in other areas and may reach 3.5 feet by 2100.[4] To stem

[1] This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement 4I-95309901-1 to the Chesapeake Bay Trust. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.
[2] U.S. EPA, Chesapeake Bay Program (CBP), Restoring the Wetlands of The Chesapeake Bay Watershed. Post-Workshop Action Plan. Prepared By: The Chesapeake Bay Program; Habitat Goal Implementation Team Wetlands Workshop Steering Committee. January 2023. Available at: https://d18lev1ok5leia.cloudfront.net/chesapeakebay/documents/2023.01.17-2023-Wetlands-Action-Plan_FINAL.pdf.
[3] Chesapeake Bay Commission, Wetlands in the Watershed, Presentation by Skip Stiles, 2022. Available at: https://www.chesbay.us/library/public/documents/Meeting-Info/September-2022/Meeting-Materials/2-Skip-Styles.pdf
[4] https://www.umces.edu/sea-level-rise-projections

these potential losses, the Chesapeake Bay Agreement has a Wetlands Outcome to create or restore 85,000 acres of tidal and non-tidal wetlands and enhance another 150,000 acres of degraded wetlands by 2025 and through voluntary restoration activities.[5] To date, only around 5% of the existing Wetlands Outcome has been met.[6] This existing Wetland Outcome is under revision: the Beyond 2025 Revision Draft of the Chesapeake Bay Agreement - which was released for public comment until September 1, 2025 - includes revised wetland targets. The tidal wetland target in the revised draft is restoration or creation of 1,000 acres and enhancement of 15,000 acres by 2035, which reflects a significant reduction from the existing goal.[7]

Regardless of the specific quantitative goal for tidal wetland restoration, new forms of finance and funding are needed to scale-up restoration efforts. Tidal wetland restoration is expensive, and per-acre costs vary based on many factors, including the restoration methods implemented and the monitoring and maintenance requirements. Using the revised goals and a range of per-acre tidal wetland restoration costs of $30,000 to $120,000, we estimate a cost of reaching the revised goal of 1,000 acres restored or created as $30 million to $120 million.[8] The cost of reaching the original goal of 85,000 acres restored or created is much higher, estimated to range from $2.6 billion to $10.2 billion using the same per-acre cost estimates. These cost estimates are underestimates as they do not include the cost of wetland enhancement acres, which are also part of the goal.

Purpose of the Project and Deliverables

The purpose of EPIC's project was to identify new and innovative financing and funding sources that can be used to pay for tidal wetland restoration projects in the Chesapeake Bay. The work specifically included researching the viability of blue carbon crediting; collating an inventory of funding and financing sources; identifying the most innovative sources that would be most appropriate to tidal wetland restoration in the Bay; finding examples of how various funding and financing sources have been leveraged both for tidal wetlands and for other restoration projects; and suggesting next steps for Chesapeake Bay jurisdictions to pursue.

Deliverables include:

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[5] Regulatory mechanisms that create or restore wetlands, such as mitigation banking to offset development-related impacts, are not included in the Wetlands Outcome.

[6] According to Chesapeake Progress, the Bay gained about 4,300 acres of wetlands from 2014 to 2022, which is 5% of the 85,000 acre goal. More data is at: https://www.chesapeakeprogress.com/abundant-life/wetlands. The Wetlands Workgroup is currently revising the Wetlands Outcome; future versions of this summary will account for any final changes that occur, such as if the Bay moves to a net-zero or net-gain Wetlands Outcome.

[7] https://www.chesapeakebay.net/files/RevisedCBW-Agreement-For-Public-Feedback-2025.06.30.pdf

[8] A definitive source of per-acre costs for tidal wetland restoration does not exist in the Chesapeake Bay and as noted these costs can vary significantly on a project-by-project basis depending on restoration interventions, developer goals, and monitoring and maintenance needs and requirements. The per-acre cost range presented here is derived from interview data about existing projects and should be considered a potential range and not an accurate overall cost estimate.

1. A memo on the blue carbon crediting opportunity
2. A funding inventory featuring over 30 federal and state funding sources
3. A summary of innovative funding & financial mechanisms
4. A "How-To Guide" for jurisdictions
5. A collection of examples of projects that effectively leverage funding/financing sources
6. A leverage strategy guidance document

Methodology

The EPIC team has been working in the Chesapeake Bay for several years, and previous projects include work identifying opportunities for conservation finance, researching innovative forms of investment, technical assistance on federal funding opportunities for conservation and restoration, and developing and updating an online Federal Funding Navigator tool. In addition to bringing its own previous knowledge to this project, EPIC carried out desk research and interviews. The team reviewed existing reports provided by the Chesapeake Bay Trust and the Wetlands Workgroup. Nearly 50 targeted interviews were held with staff at state environmental departments, federal agencies, nonprofits, and practitioners (both for profit and non-profit) to learn about new financing sources, collect examples, and to vet the relative usefulness and appropriateness of different funding sources.

The team also met regularly with Chesapeake Bay Trust staff and with members of the project's steering committee.

Brief Findings

The range of project deliverables detail our findings, but here are some top takeaways:

1. **Blue carbon crediting is not currently a viable funding source for tidal wetland restoration:** Although tidal wetlands store and sequester significant amounts of carbon (exceeding many other ecosystem types), blue carbon credit revenue cannot, today, pay for tidal wetland restoration projects. Tidal wetland restoration is expensive, costing around $40,000 per acre. Transaction costs associated with developing a blue carbon credit project are high. Current global prices for blue carbon credits (e.g., $13–$35 per metric ton of CO2e for mangroves) are far below the estimated break-even costs needed for Bay projects (e.g., $690/ton for Deal Island). Blue carbon credits may serve as a supplementary future revenue stream, but they are not a viable primary funding avenue.

2. **Innovative finance opportunities exist:** Beyond blue carbon, the project identified several tools to reduce risk and scale funding, including Pay for Success (PFS) contracts, which shift project risk to the private sector and base payments on achieving verifiable outcomes; Community-Based Public-Private Partnerships (CBP3s), which streamline procurement

for large portfolios of projects; and the potential use of State Revolving Funds (SRFs), particularly the Clean Water SRF (CWSRF), to finance tidal restoration projects.

3. **Different project phases often require different sources of funding or financing:** Our research showed that some projects rely on one grant source for project design and permitting, and another source for project implementation and construction. For example, in Maryland, projects that receive Chesapeake Bay Trust Watershed Assistance Program funding for design can then apply to the Chesapeake and Atlantic Coastal Bays Trust Fund for implementation funding.

4. **Innovations in beneficial reuse of dredge material are important.** Given that tidal wetland restoration projects often rely upon placement of sand and sediment, it would be worthwhile to continue innovations in the procurement, transport, storage, pricing, and permitting of dredge materials and projects. Dredge material can be in over-supply in some areas and under-supply in others, too heavy and costly to transport or store, or contain toxic substances. The more these challenges can be addressed, the more good projects can be completed affordably.

5. **Leveraging different sources of funding and financing is valuable.** Leveraging multiple sources of funding can bring a range of benefits to restoration projects. Such projects often attract more partner capacity, open the opportunity of larger project scope, may incorporate more flexibility into project implementation, and build in more project sustainability. The examples and models we share in this project's materials provide more details on these benefits.

Most Promising Ideas

Based on the research into leverage strategies and innovative mechanisms, the following ideas show the most promise for scaling tidal wetland restoration finance:

1. **CWSRF sponsorship programs show promise:** The CWSRF offers low-cost financing for water quality projects. While tidal wetland projects often lack a stable repayment source for traditional loans, the sponsorship model pairs a CWSRF loan for a point-source project, such as a wastewater treatment plant upgrade, with a nonpoint source project like wetland restoration. The point source borrower receives a lower interest rate, and the forgone interest is directed to fund the nonpoint source project, effectively yielding the same total repayment amount for the community sponsor. Maryland's Conservation Finance Act requires the state to implement such a sponsorship program.

2. **SRF interim finance leveraging state cost share:** This approach uses a low-interest loan program—such as the Virginia Agriculture BMP Loan Program (part of the CWSRF)—as interim finance to cover expensive upfront costs. Once the tidal restoration project is

completed and verified, public dollars from a state cost-share program (like Virginia's VACS) are used to repay the loan. This structure addresses the critical financial gap faced by landowners who cannot afford to front the construction costs of reimbursement-based programs.

3. **Centralized fundraising and project management for large-scale projects:** This strategy involves a central entity, such as The Nature Conservancy, acting as a "hub" to lead large-scale planning, identify diverse funding needs, conduct landowner outreach, and blend public funding (e.g., USDA programs, state funds) with philanthropic donations. This collaboration allows for flexibility, such as creating customized landowner incentives that maximize participation in large, multi-jurisdictional restoration efforts.

4. **New bond issuance or tax/fee referendums:** Establishing new tax or fee programs (like excise taxes, sales taxes, or property tax increases) or issuing bonds can generate sustainable, large-scale revenues for restoration efforts. The Trust for Public Land's Conservation Finance program and The Nature Conservancy's Conservation Campaigns program can advise jurisdictions interested in pursuing voter referendums for tax or bond initiatives to fund local restoration.

Next Steps and Recommendations

1. **Encourage SRF sponsorship program implementation:** Advocates and project developers should contact their state CWSRF program administrators to express interest in implementing a sponsorship model. This is particularly relevant in Maryland, where the Conservation Finance Act mandates the establishment of a sponsorship program, and in Delaware, where the existing program could be reactivated if interest rates increase.

2. **Explore feasibility of bond issuance or tax/fee programs:** Given the unique local political environment in each city, county, state, and region, a feasibility study informed by current budget status, voter interests, and scale of the need is worth undertaking.

3. **Streamlining existing processes:** Consider implementing streamlined new ways of connecting projects to funding programs that already exist through concierge roles, new AI tools, or a project accelerator model.

Memo: Blue Carbon Crediting Opportunity

October 31, 2025

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Overview

This Summary of Blue Carbon Crediting represents Deliverable 2 of EPIC's contract with the Chesapeake Bay Trust to conduct research into innovative finance for tidal wetland restoration across tidal jurisdictions in the Bay (MD, VA, DE, and DC). The focus of this Summary is to assess the feasibility of this funding source - including financial and technical feasibility and taking into consideration capacity, additionality, permanence of outcomes, and other dynamics in carbon and environmental credit markets - to enable greater conservation and restoration in the tidal wetland jurisdictions. To research this Summary, the EPIC team reviewed existing reports provided by the Chesapeake Bay Trust and Wetlands Workgroup and conducted a series of targeted interviews with staff at state environmental departments, federal agencies, nonprofits, and practitioners.

This research into blue carbon credits has demonstrated that while some projects may be feasible in some aspects, such as additional carbon sequestration over the baseline (ecological feasibility), in most cases tidal wetland restoration projects are unlikely to be financially viable through credit sales alone. Therefore, blue carbon credits may be a supplementary revenue stream for tidal wetland restoration projects at some time in the future, but are not today a viable avenue to pay for these projects.

This Summary is a draft that will be revised and refined based on input from the Wetlands Workgroup and additional data and information gathered over the course of the Innovative Financing Strategies for Tidal Wetlands project.

Introduction

"Blue" carbon is the carbon sequestered and stored in coastal and marine ecosystems. Coastal ecosystems include mangroves, tidal wetlands, and seagrasses. These coastal ecosystems sequester and store a significant amount of blue carbon in their vegetation and in the soils below - with estimates of up to 10x as much carbon sequestration potential as terrestrial ecosystems.[9] In addition to carbon sequestration benefits, coastal ecosystems provide many other benefits such as habitat for aquatic and avian species, recreation, protection of coastline from storm events, and economic development and job creation.

The Chesapeake Bay is the largest estuary in the United States and the third largest in the world. The Bay historically had 3 million acres of wetlands; this has declined by 1.5 million acres, or about

[9] International Finance Corporation, Opportunities for Blue Carbon Finance in Coastal Ecosystems, 2023. Available at: https://www.ifc.org/content/dam/ifc/doc/2023-delta/deep-blue-opportunities-for-blue-carbon-finance-in-coastal-ecosystems-optimized.pdf.

half.[10] Tidal wetlands currently cover about 284,000 acres. Further projected declines mean that the Bay's tidal wetlands and their significant carbon stores are in danger of being lost: tidal wetland loss projections range from 50% by 2100 to nearly 90% by 2080.[11] These losses are driven primarily by sea-level rise, which is happening more rapidly in the Bay than in other areas and may reach 3.5 feet by 2100.[12] To stem these potential losses, the Chesapeake Bay Agreement has a Wetlands Outcome to create or restore 85,000 acres of tidal and non-tidal wetlands and enhance another 150,000 acres of degraded wetlands by 2025 and through voluntary restoration activities.[13] To date, only around 5% of the existing Wetlands Outcome has been met.[14] Further, the Wetland Outcome is under revision and the revised outcome may result in a higher acreage goal. For example, if the Outcome moves to a no-net-loss or net gain metric, the potential wetland restoration needs may be higher - without active measures to protect and restore wetlands, 161,000 acres of tidal marsh in the Bay are projected to be lost by 2100, primarily from sea level rise.[15]

The financial cost of saving the Bay's tidal wetlands is a future area of inquiry under this project. A rough back-of-envelope estimate to create or restore 85,000 acres could be around $3.4 billion.[16] This Summary provides an assessment of the ability of blue carbon credit revenue to contribute to this potential cost. A blue carbon credit project follows a framework centered on additionality and permanence. Additionality means that the carbon stock and sequestration benefits of the carbon credit project interventions are additional to what the carbon levels would have been in a baseline scenario (without carbon credit project interventions). Permanence means that these additional expected carbon benefits are maintained through the project for a specific period of time, for the Verra standard, the duration has been 100 years. The focus on establishing, monitoring, and verifying additionality and permanence requires intensive quantification of environmental variables to evaluate the baseline and carbon credit project scenarios.

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[10] U.S. EPA, Chesapeake Bay Program (CBP), Restoring the Wetlands of The Chesapeake Bay Watershed. Post-Workshop Action Plan. Prepared By: The Chesapeake Bay Program; Habitat Goal Implementation Team Wetlands Workshop Steering Committee. January 2023. Available at: https://d18lev1ok5leia.cloudfront.net/chesapeakebay/documents/2023.01.17-2023-Wetlands-Action-Plan_FINAL.pdf.

[11]Chesapeake Bay Commission, Wetlands in the Watershed, Presentation by Skip Stiles, 2022. Available at: https://www.chesbay.us/library/public/documents/Meeting-Info/September-2022/Meeting-Materials/2-Skip-Styles.pdf

[12] https://www.umces.edu/sea-level-rise-projections

[13] Regulatory mechanisms that create or restore wetlands, such as mitigation banking to offset development-related impacts, are not included in the Wetlands Outcome.

[14] According to Chesapeake Progress, the Bay gained about 4,300 acres of wetlands from 2014 to 2022, which is 5% of the 85,000 acre goal. More data is at: https://www.chesapeakeprogress.com/abundant-life/wetlands. The Wetlands Workgroup is currently revising the Wetlands Outcome; future versions of this summary will account for any final changes that occur, such as if the Bay moves to a net-zero or net-gain Wetlands Outcome.

[15] https://www.nwf.org/~/media/PDFs/Global-Warming/Reports/NWF_ChesapeakeReportFINAL.ashx

[16] Average cost of $40,000 per acre is calculated using ESA's data on per acre tidal wetland restoration costs at the Deal Island and Coastal Bays case study sites. This value will be refined over the course of this project.

Blue carbon credit projects can include wetland creation, restoration, and conservation. Restoration practices that create additionality may include practices that change hydrological conditions, sediment supply, salinity, water quality, and vegetation. In the Bay, the rapidly rising sea level rate has led to a restoration focus of thin-layer placement to elevate wetlands, conservation of upland habitat to allow for wetland migration, and other practices such as working within ghost forests to allow for wetland migration into these areas.

Blue Carbon Credit Feasibility Summary

This section summarizes the feasibility of blue carbon credits as a revenue stream for tidal wetland restoration in the tidal jurisdictions of the Chesapeake Bay. Overall, the Summary finds that even if a project was successful in coming to market and selling credits, blue carbon projects would require funding from other sources to cover restoration costs.

It is important to note that bringing blue carbon credit projects to market is still in a nascent phase globally. Currently, these projects account for less than 1% of credit transactions in the voluntary carbon market and most of these (99%) are mangrove projects.[17] A recent increase in blue carbon credits in 2022 resulted from the Delta Blue Carbon mangrove project in Pakistan, which sold 250,000 credits.[18] Only 1% of blue carbon credit issuance has come from wetland restoration, reflecting only one project to date.

Ecological Feasibility: Significant

Ecological feasibility refers to the carbon stock and sequestration potential of an ecosystem, and the potential for restoration and conservation activities to preserve and increase these values.

The tidal wetland areas of the Bay store and sequester a significant amount of carbon. Sea level rise projections suggest that the area of salt marsh will increase in the Bay as dry land and freshwater habitats are lost until about 2075, at which point salt marshes will also decline as open water areas increase (Figure 1).[19] While numerous negative consequences will attend these changes, from a carbon perspective, there can be a net benefit to preserving existing and newly formed salt marshes - salt marshes sequester nearly as much carbon as mangroves in the form of soil carbon (Figure 2) and the carbon sequestration exhibited by estuarine wetlands far exceeds that of other land use and ecosystem types (Figure 3) due to high rates of photosynthesis, increasing soil volumes over time, and the slow rate of organic decomposition in wetland environments.

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[17] As of January 2024, blue carbon projects accounted for 0.2% (~5 million credits) of total carbon credit issuance .

[18] https://deltabluecarbon.com/

[19] A National Wildlife Federation report estimates an increase in salt marshes to 2075, but then declines as sea level rise continues.
https://www.nwf.org/~/media/PDFs/Global-Warming/Reports/NWF_ChesapeakeReportFINAL.ashx

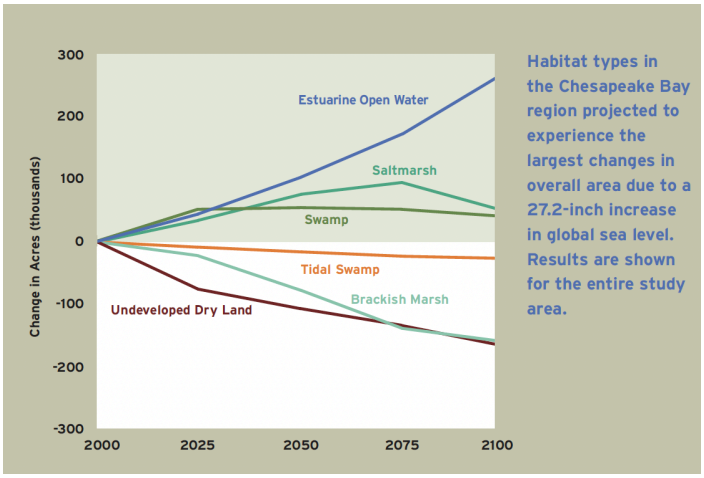

Figure 1: Changes in Habitat Types in the Bay with Sea Level Rise

Source: [National Wildlife Federation 2008]

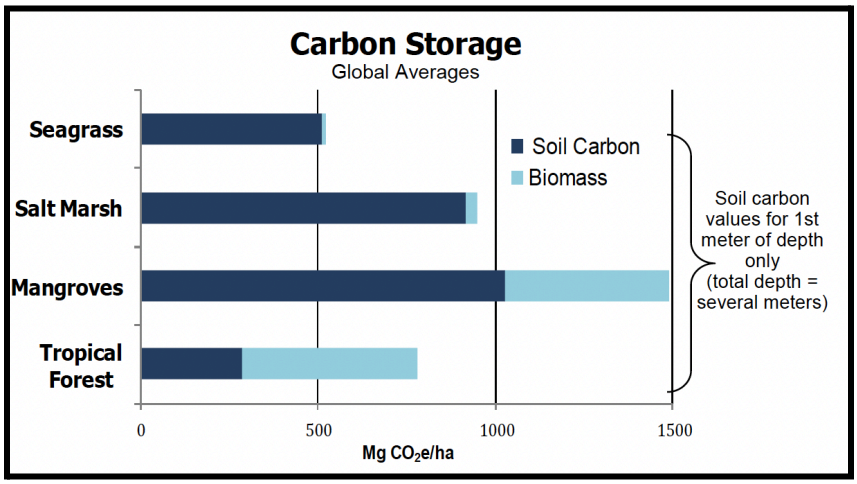

Figure 2: Carbon Storage in Different Ecosystem Types

Source: [RAE Coastal Blue Carbon Factsheet, 2018]

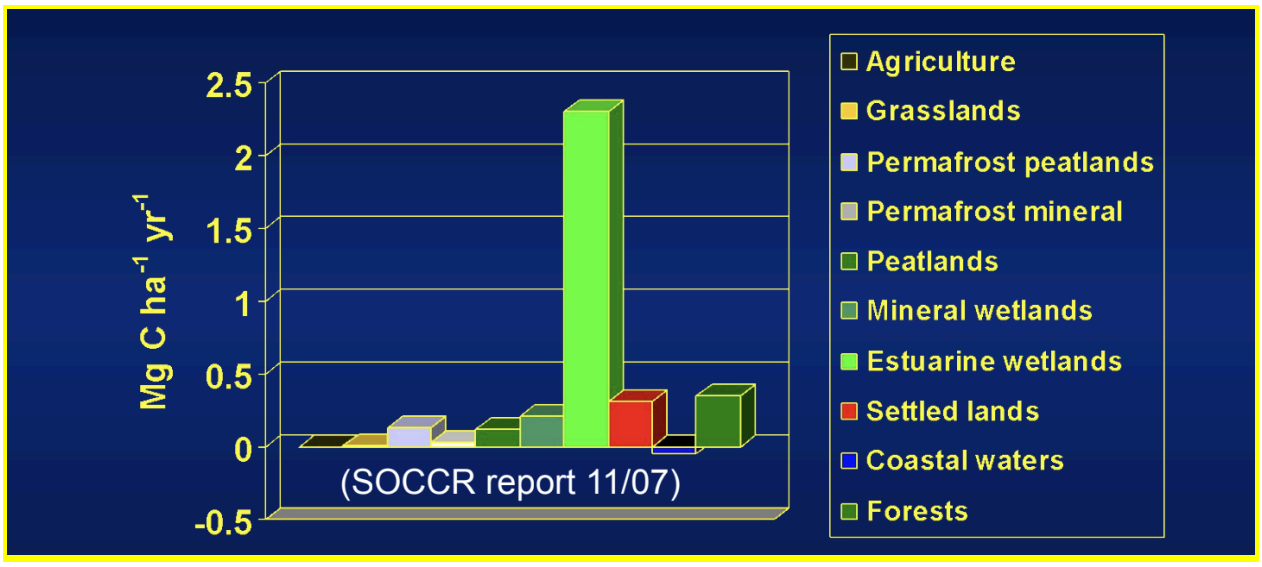

Figure 3: Carbon Sequestration Rates Across Ecosystem Types

Source: First State of the Carbon Cycle Report (SOCCR) 2007

Results from work on carbon fluxes from wetland ecosystems in Maryland estimated that estuarine coastal wetlands in the Chesapeake Bay sequester an average of 0.84 Mg C (3.07 Mg of CO2e) per acre annually. This is higher than the national average used by EPA - 1.22 Mg CO2e per acre per year for estuarine coastal wetlands.[20]

As discussed, existing tidal wetland areas in the Bay are also subject to high rates of loss, creating additionality opportunities for tidal wetland conservation and restoration. More saline areas of the Bay with less methane emissions may have more of a net carbon benefit, but ideally the life cycle of the restoration project would be included and could impact the net carbon benefit where restoration practices create emissions of their own. This is an area of further inquiry using life-cycle assessment.

Technical Feasibility: Moderate

Technical feasibility refers to the ability to adequately establish a baseline, manage and monitor for long-term performance and outcomes, and leverage methodologies that can certify projects for blue carbon credit releases. Environmental data requirements associated with successful

[20] Maryland Department of the Environment and Department of Natural Resources, Maryland Blue Carbon Flux: Estuarine Wetlands and Submerged Aquatic Vegetation, Data and Methodology Documentation, January 2023. Available at: https://mde.maryland.gov/programs/air/ClimateChange/Documents/VIMAL/MD_BlueCarbon_Flux_Methodology_01.06.23.pdf.

implementation of these project needs are high and include carbon stock and sequestration rates across ecosystem and vegetation types, land use changes, hydrologic dynamics and sea level rise, and salinity.

The Bay Program has an infrastructure supporting data collection to measure and monitor Chesapeake Bay Agreement goals, a huge advantage for this region that can contribute to blue carbon credit efforts as they evolve. For example, the Bay has long-term monitoring of the extent of submerged aquatic vegetation (SAV). States such as Maryland have also conducted blue carbon inventories to understand sequestration in wetland ecosystems. In Maryland, home to many of the tidal wetland areas across the tidal jurisdictions, effort has been made to incorporate blue carbon fluxes into state-level greenhouse gas reporting, including fluxes from estuarine wetlands and submerged aquatic vegetation (SAV, e.g., seagrasses).[21]

Data required to support robust blue carbon credit projects varies across the Bay (Figure 4). A "blue carbon report card" evaluates coastal states on their efforts to understand sequestration in tidal wetland ecosystems by the quantity and quality of data they collect.[22] This assessment placed Virginia and Maryland in the "fair" category overall, noting limitations in the quantity and quality of soil samples (for Maryland) and quantity and habitat coverage of soil samples for Virginia. However, it is important to note that for carbon crediting, on-site data would still need to be collected, so limitations in existing data are not necessarily a barrier.

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[21] Maryland Department of the Environment and Department of Natural Resources, Maryland Blue Carbon Flux: Estuarine Wetlands and Submerged Aquatic Vegetation, Data and Methodology Documentation, January 2023. Available at: https://mde.maryland.gov/programs/air/ClimateChange/Documents/VIMAL/MD_BlueCarbon_Flux_Methodology_01.06.23.pdf.

[22] The specific metrics are: data quantity (the number of soil samples - cores - compared to the wetland area of the state); data quality (how well the cores estimate blue carbon); spatial representation (how well cores are distributed across the state's wetland areas); and habitat representation (how well cores represent habitat areas of the state). Coastal Carbon Network, State of the Data: United States Blue Carbon Data Report, June 12, 2024. Available at: https://serc.si.edu/sites/default/files/pictures/BiogeochemistryLab/CoastalCarbonRCN/Other/ccn_database_v1.2.0_report_us.pdf?189.

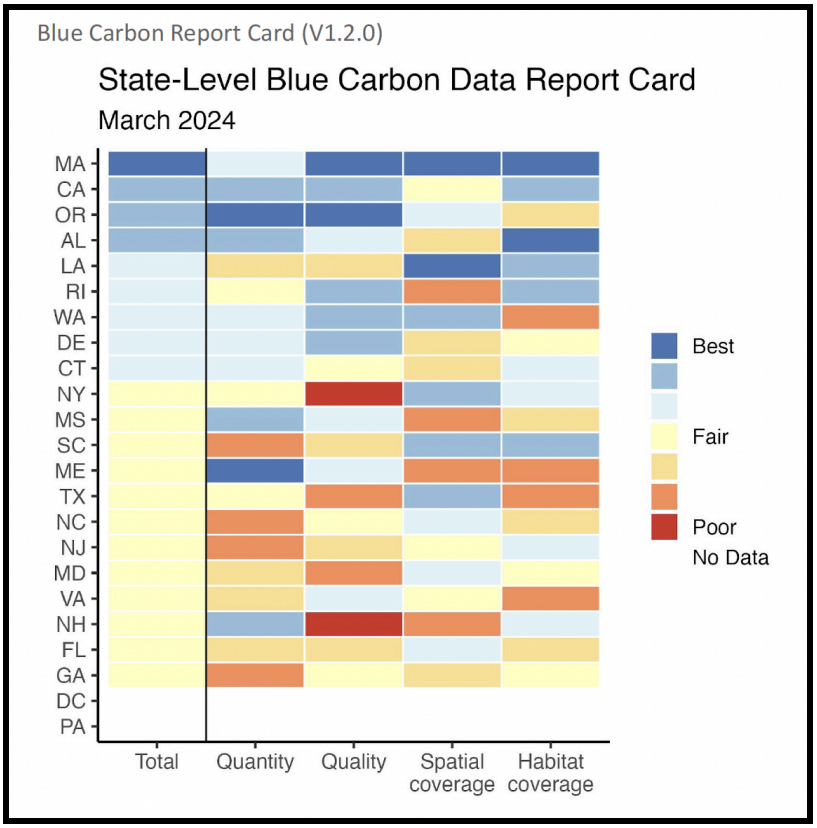

Figure 4: State Level Blue Carbon Data Report Cards

Source: [United States Blue Carbon Data Report, 2024]

The science of blue carbon in the Bay is complicated. The dynamic nature of the Bay's tidal wetland areas - particularly with sea level rise rates nearly twice the global average - translate into impacts to and movement of tidal wetlands being difficult to keep pace with. Sea level rise causes tidal wetlands to move from a carbon sink to a carbon source, as carbon is released upon wetland submergence. Tidal wetlands also release significant amounts of methane, another potent greenhouse gas, that can negate some proportion of the carbon sequestration benefit. Methane releases from tidal wetlands depend on salinity - high saline wetland areas do not emit much, but methane emissions vary in freshwater and brackish wetland areas. The range in salinity across the Bay complicates efforts to understand net carbon sequestration benefits. Most of the Bay's water is brackish, with salinity levels that still range considerably from (0.5 to 25 ppt); the mouth of the Bay is the most saline (25-30 ppt) while the tidal rivers and upper Bay are less saline (less than 0.5 ppt).[23] Salinity also varies with the seasons through the year and over time across years.

[23] Chesapeake Bay Program, Physical Characteristics of the Bay. Available at: https://www.chesapeakebay.net/discover/ecosystem/physical-characteristics#:~:text=Chesapeake%20Bay%20salinity&text=Salinity%20is%20highest%20at%20the,of%20less%20than%200.5%20ppt.

Additional work is required to fill certain scientific knowledge gaps on carbon stock and sequestration values. Scientific gaps that could improve carbon flux estimates include[24]:

- Reducing uncertainties in low salinity environments: carbon and methane fluxes in wetland areas with low salinity are less well understood than in higher salinity environments.
- Improving estimates of wetland extent.
- Understanding differences in carbon storage and sequestration rates based on wetland conditions.
- Conducing more research into submerged aquatic vegetation systems.

The potential for tidal wetland blue carbon credit projects is enabled by established methodologies. One methodology is Verra's Verified Carbon Standard VM0033, Methodology for Tidal Wetlands and Seagrass Restoration.[25] This methodology facilitates the development of blue carbon credit projects that can be verified, but there have been challenges to compliance in tidal wetland ecosystems. A particular challenge is ensuring permanence: blue carbon credit projects are required to maintain carbon stock and sequestration levels for a specified time period - typically for 100 years. The risk of a project not delivering these outcomes arises from a number of climate and other risks that can damage projects within the project time period. Extreme weather events, increased salinization, and sea level rise are some of the events that can damage tidal wetlands, making it difficult for project developers to ensure long-term carbon. In the Bay, where sea levels are rising faster than in other parts of the world, the location of current and future tidal wetland areas are dynamic and may not last over the long periods of time required for carbon permanence.

While meeting some of the standards - such as the 100 year permanence requirement - have been barriers for tidal wetland projects, recent and on-going revisions to the methodology (discussed below) hold some promise to make these projects more feasible.

Financial Feasibility: Low

Financial feasibility refers to the ability of a project to generate funding capable of covering restoration and blue carbon credit project development costs.

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[24] Recommendations for filling scientific gaps as included in Maryland Department of the Environment and Department of Natural Resources, Maryland Blue Carbon Flux: Estuarine Wetlands and Submerged Aquatic Vegetation, Data and Methodology Documentation, January 2023. Available at: https://mde.maryland.gov/programs/air/ClimateChange/Documents/VIMAL/MD_BlueCarbon_Flux_Methodology_01.06.23.pdf.

[25] Verra's VM0033 Methodology is available at: https://verra.org/methodologies/vm0033-methodology-for-tidal-wetland-and-seagrass-restoration-v2-1/.

Blue carbon projects are technically complicated and expensive throughout the project cycle. Hydrology, especially in the face of rapidly rising sea levels, is complicated, making identifying and prioritizing conservation and restoration sites require robust data and modeling capacity; restoration methods in marine environments are expensive; conservation of coastal properties is likewise expensive; and dynamic marine ecosystems are most time-intensive and expensive to manage, measure, monitor, and verify.

Tidal wetland restoration is very expensive. Tidal wetland restoration projects have high implementation costs, due to the complicated hydrologic environments in which they are located. Using an average tidal wetland restoration cost of $40,000/acre, we estimate that reaching the goal of 85,000 acres of wetlands created and restored would cost $3.4 billion dollars alone.[26] This does not include the additional goal of 150,000 acres of enhanced wetlands. Further, this cost is likely to be higher if the Chesapeake Bay Agreement Wetlands Outcome is revised to a net-zero or net-gain outcome. Conservation as a practice is also very expensive in coastal environments given high land values.

Implementing a blue carbon credit project on top of tidal wetland restoration makes these projects even more expensive. Transaction costs associated with entering the carbon markets are high for blue carbon. Most costs associated with developing a blue carbon credit project for tidal wetland restoration are in addition to the restoration costs, with the exception perhaps of some period of monitoring that many restoration projects have difficulty securing funding for. Blue carbon credit project costs (Figure 5) include hiring a consulting firm to conduct a feasibility study, and if the project is feasible, hiring a firm to produce a Project Design Document (PDD). A baseline must be quantified, and then long-term monitoring, reporting, and verification (MRV) must be conducted to assess the performance and outcomes of the project. Future versions of this assessment may include cost data associated with these aspects of a blue carbon credit project. Conversations with those working closely with practitioners suggest that the revenue from carbon credits may partially offset monitoring and maintenance costs of the project, but at present cannot cover restoration costs.

[26] Average cost of $40,000 per acre is calculated using ESA's data on per acre tidal wetland restoration costs at the Deal Island and Coastal Bays case study sites.

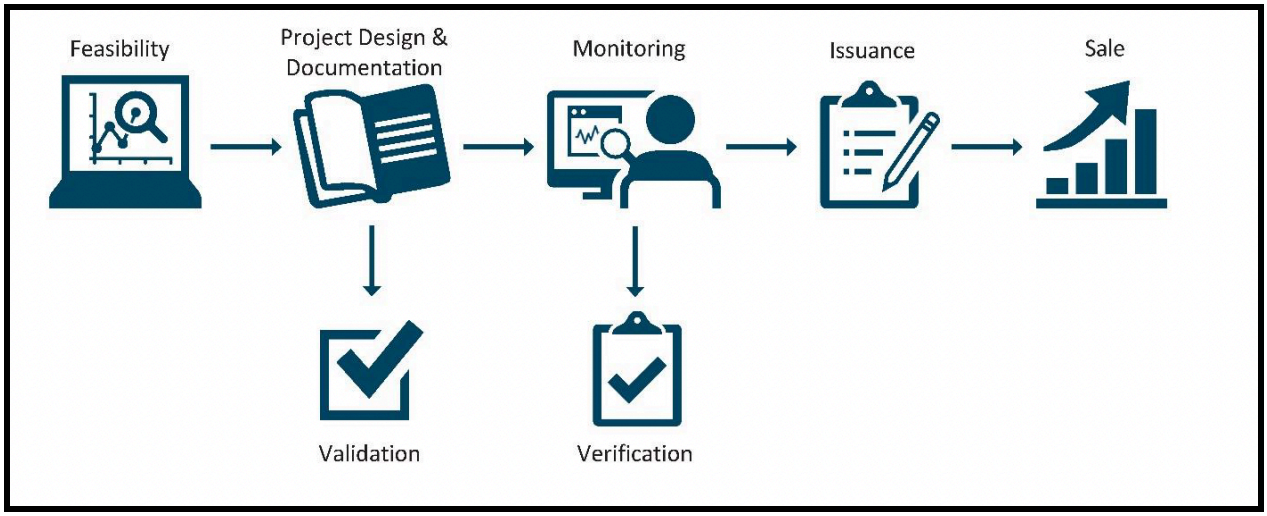

Figure 5: Carbon Credit Market Process

Source: TNC MD Feasibility Report

At current prices, blue carbon credits cannot cover costs of tidal wetland restoration projects. As noted, a back-of-the-envelope tidal wetland restoration cost of $40,000 per acre cannot be significantly returned through carbon credit revenues. In Maryland, a 2023 study by ESA for TNC and MD DNR[27] (described in more detail below) assessed feasibility of several project sites for blue carbon credit projects and estimated a blue carbon break-even cost for one site (Deal Island) as $690/ton. This is far in excess of the current carbon credit revenue observed for mangroves in Asia ($13-$35 per metric ton of CO2e). Understanding the potential price implications of carbon credits for Bay tidal restoration projects is complicated by the fact that there is no existing blue carbon credit price data in the United States, but several expert interviews have supported the conclusion that carbon credit prices today cannot compensate for restoration costs, and in some cases may not even cover the cost of applying a carbon credit project to an existing restoration site.

Lack of economies of scale. Economies of scale for blue carbon credit projects would be difficult to reach in coastal Bay areas. The high transaction costs associated with developing carbon projects means that larger projects are more financially feasible. Many successful blue carbon mangrove projects, for example, are large in scale - the world's first blue carbon project was a 290-acre

[27] ESA, TNC Maryland Blue Carbon Resilience Credit Feasibility Study, December 2023. Available at: https://dnr.maryland.gov/ccs/Documents/Maryland-Blue-Carbon-Resilience-Credit-Feasibility-Study-2023-12-22.pdf.

mangrove project in Kenya[28] and a recent project in Pakistan was 860,000 acres.[29] Contrast these acreages with private ownership of much smaller acreages along the coastline of the Bay. Reaching scale on wetland restoration projects is challenging given the Bay context, where there is much less land area on which to implement blue carbon projects.

To meet carbon mitigation goals, voluntary buyers have cheaper carbon credit options to blue carbon. In 2023, carbon credits were priced from $40-$80 per CO2e but can vary depending on demand - in 2021, carbon trading prices fell to under $13 per ton.[30] As noted, mangrove blue carbon credits have ranged in price from $13-$35 in Asia and Central America.[31] If carbon credit buyers are indifferent to location, they may seek the cheapest carbon credits available; however, some buyers such as corporations with a vested interest in specific coastal areas may pay higher prices for credits specific to particular geographies and/or ecosystems.

Policy & Legal Feasibility: Moderate

The science and cross-jurisdictional collaboration enabled by the Chesapeake Bay Program provides a strong foundation for any future blue carbon credit projects but certain policy and legal complications impact the feasibility.

Lack of regulatory demand. While the Wetland Outcome is formalized in the Chesapeake Bay Agreement, there is no regulatory driver for blue carbon credits and no guaranteed source of demand. This may limit demand for credits and provide a disincentive to development.

Complicated land and carbon rights. Legal complications surround rights to land and the carbon credits generated from land, including where the land is underwater. Conflicting or unclear land rights can complicate blue carbon projects, where an entity needs to have the rights to own and transact the carbon from the land. In the Bay, tidal wetland areas can be both public and private. Where projects occur on public land, the public jurisdiction needs to hold a right to obtain and sell carbon credits. In Virginia, this was accomplished through introducing legislation to support TNC's seagrass project - an action that may be required elsewhere in tidal jurisdictions to support state ownership and sale of carbon credits. In Maryland, land below mean high tide is in public ownership - as mean high tide changes this could mean changing rights across public and private landowners. Further, jurisdictions such as Maryland may need legislation to ensure the right of the state to own and sell carbon credits from tidal wetland projects.

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[28] https://www.planvivo.org/mikoko-pamoja

[29] https://verra.org/programs/ccbs/delta-blue-carbon-1-indus-delta-mangrove-restoration-project-phase-1/

[30] https://8billiontrees.com/carbon-offsets-credits/carbon-credit-price-per-ton/#:~:text=This%20price%20is%20determined%20by,to%20%2480%20per%20metric%20ton.

[31] https://www.spglobal.com/commodity-insights/en/news-research/latest-news/energy-transition/102521-blue-carbon-gains-interest-in-effort-against-greenhouse-gases-but-challenges-remain

Blue Carbon Case Study Examples

Tidal wetland restoration projects are on-going across the Bay and the country, but feasibility considerations underscore the very limited number of blue carbon credit projects for these ecosystems. As stated, to date there has not been a single blue carbon credit sale from projects in the United States. This section summarizes information on one evolving seagrass project in Virginia, and summarizes conclusions from a feasibility study conducted at potential blue carbon credit project sites in Maryland.

In Virginia's Coastal Bays, TNC and a robust partnership have developed the first blue carbon credit project for seagrass in the world. This project, started in 2015, demonstrates the successful application of Verra's Tidal Wetlands Methodology in an area adjacent to the Chesapeake Bay.[32] The project is seeding restoration plots of seagrass meadows in the Virginia Coast Reserve (VCR) which is managed by the TNC but owned by the Commonwealth of Virginia. The project has benefited from a number of enabling conditions: relatively pristine water quality in the project area; existing land protections in the VCR; established and long-term partnerships across NGOs, state agencies, and research entities; and long-term data collection on seagrass meadows in the VCR since its establishment decades ago. The project area is a proof-of-concept for blue carbon credits for seagrass restoration and will be able to release credits after the verification process currently underway is concluded. Verra estimates that the project will generate over 40,000 tons of CO2e net GHG emission removals over a 30-year crediting period. While this project exhibits a number of enabling conditions that would be difficult to replicate in the Bay (particularly the water quality), the project has still been lengthy and complicated, and is now 10 years from establishment. Large and well-resourced organizations such as TNC are able to conduct lengthy projects such as this one, but it would be difficult for smaller and less well-resourced organizations. Further, the project team had to work with the Commonwealth to introduce legislation allowing the state to own and sell carbon credits. This legal hurdle was discussed above and is an important consideration and potential barrier to conducting blue carbon credit projects in tidal wetland areas that may be owned in whole or part by public entities.

In Maryland, a 2023 study by ESA for TNC and MD DNR[33] assessed the technical, financial, legal, and organizational feasibility of blue carbon and resilience credits of five projects (four blue carbon credit projects and one resilience credit project) in the Chesapeake and Coastal Bays (Table 1). Blue carbon projects were: Deal Island Marsh Restoration, Maryland Coastal Bays Marsh Restoration, Blackwater Marsh Migration Space and Crisfield Barrier Island Restoration. The Crisfield project was also assessed for feasibility for resilience credits.

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[32] https://registry.verra.org/app/projectDetail/VCS/2360

[33] ESA, TNC Maryland Blue Carbon Resilience Credit Feasibility Study, December 2023. Available at: https://dnr.maryland.gov/ccs/Documents/Maryland-Blue-Carbon-Resilience-Credit-Feasibility-Study-2023-12-22.pdf.

A summary of findings for the case studies is presented below. The study found more areas (~45,000 acres in Maryland) that met requirements for beneficial reuse of sediment (e.g., thin-layer placement to raise the elevation of marshes and mitigate sea level rise inundation) than for upland conservation for marsh migration. The thin-layer placement areas had the potential to store and sequester 7.8 million tons of CO2e over 30 years (and over the baseline conditions). The two case study sites implementing thin-layer placement (Deal Island and the Coastal Bays) have potential for both technical (e.g., meeting 100-year permanence requirements) and financial feasibility but at a high price point - the blue carbon break-even cost for Deal Island (20-years) is $690/ton and for Coastal Bays it is $107/ton. A lack of blue carbon credit sales in the U.S. makes it difficult to ascertain how reachable these costs are, but credit data globally for mangroves shows carbon credit prices ranging from $13-$35 per metric ton of carbon in Asia and Central America[34] suggesting that carbon credit sales cannot meet the costs even of the blue carbon credit portion of projects, which are in addition to the restoration costs.

TABLE ES-1
SUMMARY OF ALL BLUE CARBON CASE STUDIES

Site	Project type	Project benefit	Approx size (ac)	Cost[1]	Project lifespan[2] (years)	Carbon benefit of project over baseline (tonnes)	Break-even price over 50-years[3] (per tonne)	Credit Feasibility
Deal Island	Beneficial use of dredged material	Maintains habitat; protects infrastructure	670	$35,307,000	~100	20,970	$84	Potential
Coastal Bays	Beneficial use of dredged material & runneling	Maintains habitat; soft transition for saltwater intrusion on farmlands	1,314	$32,903,000	~90	25,030	$26	Potential with recurring fill placements
Blackwater[4]	Land easement	Protects future habitat	n/a	n/a	Would not begin until end of century	n/a	n/a	No, technically infeasible at this time
Crisfield[5]	Beneficial use of dredged material	Maintains habitat; provides continued wave barrier	1,056	n/a	20	42,550	n/a	Potentially technically feasible with recurring fill placements

NOTES:
1. Project implementation cost only.
2. How long the habitat will last before it is drowned due to sea-level rise.
3. Price to cover the carbon market costs
4. Blackwater was determined to be technically infeasible, so a financial analysis was not performed.
5. Crisfield did not have a specific project to evaluate, so an example project was developed. A financial analysis was not performed.

Table 1: Summary of Blue Carbon Case Studies

34 https://www.spglobal.com/commodity-insights/en/news-research/latest-news/energy-transition/102521-blue-carbon-gains-interest-in-effort-against-greenhouse-gases-but-challenges-remain

Source: ESA, TNC Maryland Blue Carbon Resilience Credit Feasibility Study, December 2023.

Future Opportunities

While not financially feasible now, a number of evolving conditions in the Bay and the carbon credit markets present opportunities for future blue carbon credit project development in the Bay.

- **There is demand for tidal wetland restoration.** Tidal wetland jurisdictions in the Bay have a lot of very important tidal wetland habitat areas and a commitment to restoring tidal areas through the Chesapeake Bay Agreement Outcomes.

- **Permanence requirements may become less onerous.** A loosening-up of the permanence requirement under the Verra standard applicable to tidal wetland restoration projects (VM0033)[35] may enable more projects to have technical feasibility, particularly in areas like the Bay experiencing rapid sea level rise. The Verra standard also may be decreasing the previous permanence requirement of 100 years to 40 years - meaning that projects can maintain carbon storage and sequestration for a shorter time period and are still eligible for certification.[36] The most recent update to the standard also permits changes in project area during the project crediting period, which translates into a project remaining under the standard as it migrates upland due to sea level rise.

- **Technology is being deployed to reduce project costs.** Recent digital advances in verifying blue carbon projects promise to reduce project development costs and may enable more projects to achieve financial feasibility. Verra has been digitizing methodologies from its Verified Carbon Standard (VCS) program and making these available on its Verra Project Hub. The digital methodology for VM0033 is currently undergoing User Acceptance Testing and has been applied in a recent mangrove project in Senegal.[37] The efficiency gains from digital monitoring, reporting and verification (dMRV) that are part of this effort are likely to be hugely important for increasing the ability of tidal wetland restoration projects to participate in the voluntary carbon markets.

  Similarly, remote sensing and other technological advances could lower the costs of monitoring and verification of projects and increase the confidence in carbon stocks and fluxes.

- **Blue carbon credits command higher prices in the voluntary carbon space.** The number of blue carbon credit transactions is increasing annually, and blue carbon credits appear to

[35] VM0033 Methodology for Tidal Wetland and Seagrass Restoration, https://verra.org/methodologies/vm0033-methodology-for-tidal-wetland-and-seagrass-restoration-v2-1/.
[36] This is uncertain but will be confirmed in future versions of this report.
[37] ALLCOT Blue Carbon (ABC) Mangrove Restoration Project in Senegal, listed as Verra Project 4653. More information on the collaboration to digitize VM0033 is available at: https://verra.org/verra-and-hedera-to-accelerate-digital-transformation-of-carbon-markets/.

receive a higher price than other carbon types. A higher price may result from the higher relative cost of these types of marine conservation and restoration projects, and the value placed on these ecosystems by buyers who see the multiple co-benefits provided. A recent study confirms the potential value of blue carbon credits: The recent surge of carbon prices is expected to continue, from a range of $15 to $24 in 2022 to $40 to $65 in 2040. Blue carbon projects could fetch prices at the higher end of these ranges.[38]

- **Insurance options to de-risk investments are growing.** Insurance options for tidal wetland conservation and restoration are increasing. Insurance policies can mitigate a variety of risks (e.g., non-permanence risk) that can effectively de-risk investment into blue carbon projects and the credits they generate.

- **Demand for blue carbon credits may rise.** The Taskforce on Scaling Voluntary Carbon Markets estimates that demand for blue carbon credits may increase to be a $50 billion market by 2030.[39] Voluntary demand for blue carbon credits, and the potential willingness of some buyers to pay higher prices for blue carbon credits could increase potential revenues from these projects. Entities such as the Blue Carbon Buyers group may also stimulate more demand.[40]

Recommendations

Blue carbon is an important area of inquiry and research, but the blue carbon credit market is nascent - there has not been a single blue carbon credit project that has come to market in the United States - and the economic barriers to entry are high without sufficient expected revenue to cover costs. Despite advances in methodologies and the promise of technology to lower project-related costs, restoration and conservation remain very expensive in coastal areas.

With its endowment of valuable tidal wetland resources, the Bay is well-positioned to ride the blue carbon credit wave that is gaining momentum around the globe when and if it is feasible in the Bay's tidal ecosystems. The markets have to date reflected a preponderance of mangrove projects, but seagrass and tidal wetland projects are developing as well. However, the Bay is unlikely to see the benefits of blue carbon credit projects in the timeframe required to secure sustainable sources of funding for tidal restoration work. Blue carbon credits are far from being a viable and replicable source of funding for tidal wetland restoration in the Bay.

For this reason, we make the following recommendations:

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[38] International Finance Corporation, Opportunities for Blue Carbon Finance in Coastal Ecosystems, 2023. Available at: https://www.ifc.org/content/dam/ifc/doc/2023-delta/deep-blue-opportunities-for-blue-carbon-finance-in-coastal-ecosystems-optimized.pdf.
[39] Taskforce on Scaling Voluntary Carbon Markets, Final Report, 2021. Available at: https://www.iif.com/Portals/1/Files/TSVCM_Report.pdf.
[40] https://beyond-alliance.org/wp-content/uploads/2021/11/Blue-Carbon-Buyers-Alliance.pdf

- Well-resourced organizations (e.g., large international NGOs) should continue building the case for blue carbon credits through proof-of-concept projects and engaging with registries and methodologies to lower barriers to entry.
- The Wetlands workgroup should focus the strategy on other potential sources of funding and financing but keep up-to-date on developments in the blue carbon credit space.
- Continuing to fill gaps in scientific understanding will support blue carbon credit projects in the future.
- Focused work is needed to make tidal wetland restoration less expensive. Tidal wetland restoration has high implementation costs from the nature of working in coastal environments. While there are some restoration projects that are cheaper than others and may leverage volunteer staff, restoration necessary for the Bay to achieve the Wetlands Outcome will require methods such as thin-layer placement that require technical expertise, working with landowners and contractors, and construction in a marine environment. Conservation will likewise be expensive given the relative land values in coastal areas. Restoration costs can be lowered through innovations and changes in how projects are procured, permitted and financed. Several Bay states already have innovative Pay-for-Success procurement projects (e.g., the Clean Water Commerce Act) that could be leveraged to pay for tidal wetland restoration project outcomes. Maryland has been working on improving permitting for restoration projects including tidal wetlands. Recommended permitting improvements include developing standardized permits and adjusting monitoring requirements.[41] Maryland's Green and Blue Infrastructure Policy Advisory Commission is also currently developing final recommendations on permitting.

[41] Maryland Department of the Environment, Ecological Restoration Permitting Study Report, 2024. Available at: https://mde.maryland.gov/programs/water/WetlandsandWaterways/Documents/Restoration/MDE_Ecological%20Restoration%20Study%20Report_8.6.2024.pdf.

Summary of Innovative Funding & Financial Mechanisms for Tidal Wetland Restoration

October 31, 2025

Contact: Kavita Kapur Macleod, kmacleod@policyinnovation.org and Phoebe Higgins, phiggins@policyinnovation.org

Federal and State Funding Sources

We feature over 30 federal and state funding sources in a Funding Inventory (spreadsheet) shared as another deliverable with this project. The inventory includes information on individual funding programs, including eligibility, target geographies, funding levels, match requirements, contact information, and more.

Parametric Insurance for Tidal Wetlands

An insurance policy transfers the risk of financial loss from damage from the insured (e.g., a homeowner) to an insurance company. In exchange for the risk transfer, the insured parties pay a premium - usually an annual fee that is split into a number of payments over the year. The insurance company balances its exposure to risk by collecting premiums from a large pool of insured parties that is used to pay insured parties when claims are filed. The coverage of a policy refers to the types of events that are covered by the policy, and the amount the policy will reimburse the claimants for. Typical forms of insurance include home, health, and auto insurance.

A newer type of insurance is growing for the restoration sector. Insurance products can support greater investments in tidal wetland restoration in several different ways. A robust discussion is happening currently about insurance and nature. On the one hand, researchers and practitioners are trying to understand how valuing the risk reduction benefits provided by nature-based solutions might impact insurance policies. Where the science and evidence on the risk reduction benefits of tidal wetlands on coastal properties is available - for example, by reducing storm surge impacts and damage claims - insurance companies may be compelled to reduce homeowner premiums in coastal areas. On the other hand, insurance companies are starting to offer policies to cover damage to the tidal wetland restoration project itself, or to investments made into the project, which can incentivize greater investments into these projects such as through blue carbon projects.

Insurance mechanisms reduce the risk of investing in tidal wetland restoration. One innovative mechanism is parametric, or index-based, insurance. Unlike traditional insurance that pays out once damage is incurred, parametric policies pay policy holders when a specific trigger event occurs - irrespective of the damage incurred. In this way, the parametric insurance policy is covering the probability of the trigger event occurring. Because a claim does not need to be filed, parametric insurance policies are useful for ecosystems that require quick restoration after damage; for example, these policies have been used to insure coral reefs in Mexico.[42] A parametric insurance policy for tidal wetlands could cover events such as hurricanes, where the trigger would be a particular wind speed, or water elevation changes. Coastal communities, business, local governments, and others who benefit from or have an interest in a healthy tidal wetland ecosystem could all be policy-holders of a parametric policy.

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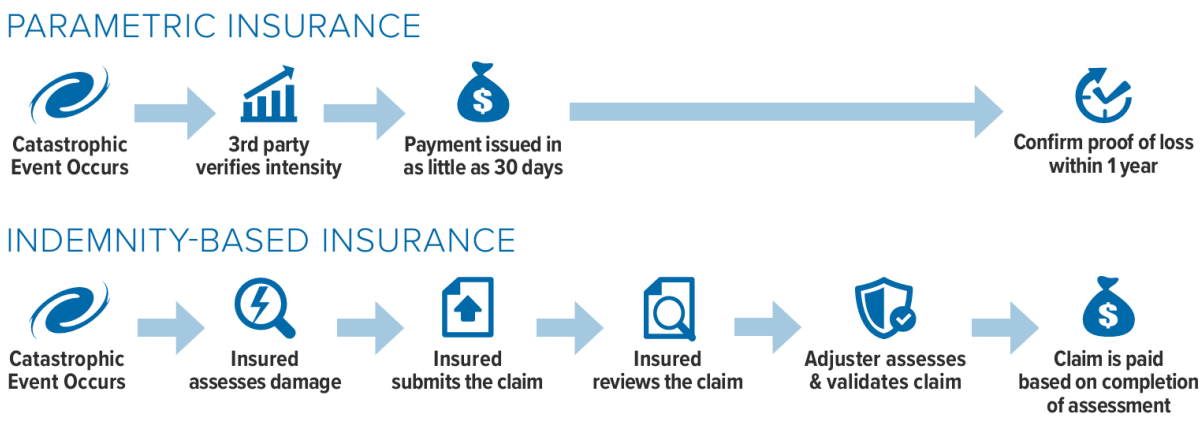
[42] https://www.nature.org/en-us/newsroom/first-ever-us-coral-reef-insurance-policy/

Financial Structure

Parametric insurance policies involve an insurance company and an insured entity that sign an insurance contract detailing coverage and premium payments. The insured makes premium payments just as under traditional, indemnity-based insurance, but the sequence of events between the parties differs with regard to how payments back to the insured are made. With a parametric policy, a specific trigger (e.g., a particular wind speed) verified by a third-party results in a quick payment to the insured party. For indemnity-based insurance, there is a lengthier claims process that can delay critical payments to do restoration work.



Enabling Conditions

Implementing a parametric policy requires the following enabling conditions:

- A measurable and credible threat that has enough of a probability of occurring to justify paying a premium;
- A robust risk model that can credibly evaluate the benefits of tidal wetlands and price the policy and payout levels accordingly;
- An insurance company that is willing to write a policy for an ecosystem such as tidal wetlands;
- An entity that has the necessary funding to afford the annual premium and the willingness to forgo the opportunity cost of using that funding for other purposes.

Risks/challenges/barriers

Parametric insurance has not been implemented in the Bay and would be a proof-of-concept policy. A parametric insurance policy would be a cost center (rather than a means for generating revenues to cover new project costs) unless the policy is triggered. In this case, insurance only provides money for tidal restoration *if* a damaging event occurs.

Parametric Insurance Example

Coral reefs are at risk globally from increasing storms, pollution, and warming ocean temperatures. Restoring them after storm events is essential to do as quickly as possible, because once damaged coral reefs die quickly. The Nature Conservancy helped to establish a parametric insurance policy with Swiss Re in the state of Quintana Roo, Mexico to protect the Mesoamerican Reef system. A trust - the Coastal Management Zone Trust (CMZT) - was established by the Government of Quintana Roo to hold funding from private and public sources, including coastal property owners and businesses that benefit from the risk reduction and tourism benefits the reefs provide. CMZT holds the parametric insurance policy with Swiss Re. The policy pays out on a pre-defined parameter of wind speed, which allows for quick payments for reef restoration in the event of a storm event. In 2020, the policy was triggered by Hurricane Delta, providing an $850,000 payment for restoration of the reef.[43]

43

https://www.swissre.com/our-business/public-sector-solutions/case-studies/mexico-windstorm-cover.html#:~:text=The%20solution,USD%209%20billion%20annually.%E2%80%8B

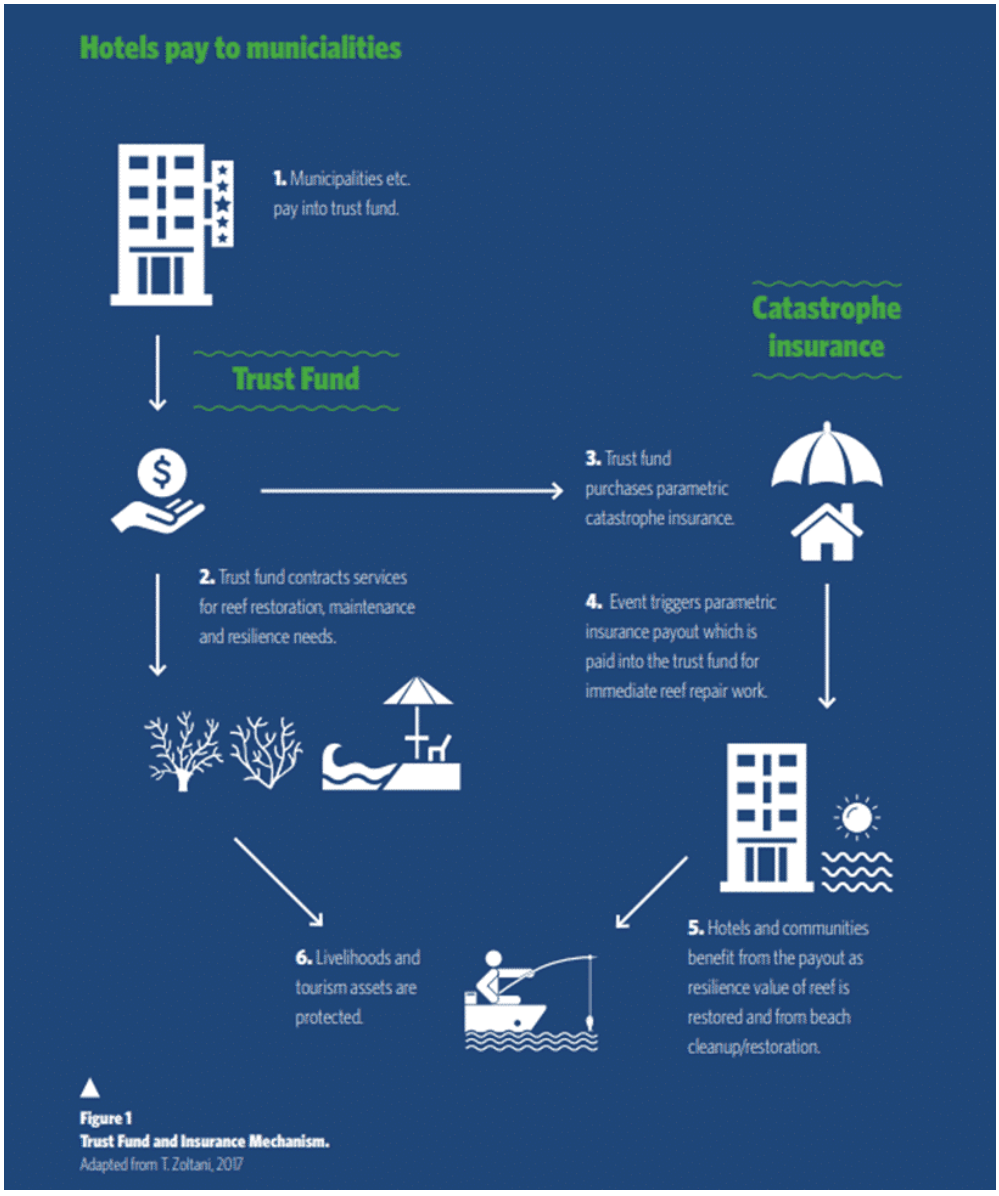


Figure 1
Trust Fund and Insurance Mechanism.
Adapted from T. Zoltani, 2017

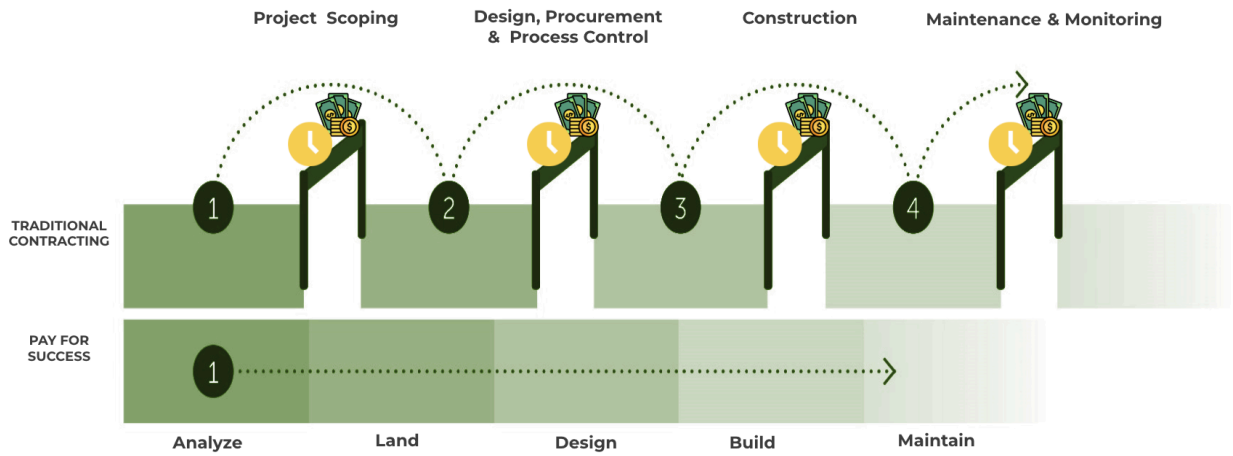
Source: [Beck et al 2020]

Pay for Success

Pay for Success contracting (PFS), also known as pay for performance or outcomes-based contracting, is a procurement strategy that defines desired outcomes and invites the private sector to deliver those in advance of payment to ensure outcomes are achieved. Instead of traditional invoicing and payment that happens on a regular basis (i.e., monthly, quarterly, etc.), a significant amount of the total payment for Pay for Success contracts is paid only when the project has been completed and verified outcomes have been measured or modeled, often by a 3rd party evaluator. This helps create positive economic pressure, allows the private sector to take on the risk of achieving project outcomes, and ensures that funding goes as far as possible. Payments are based on delivery and verification of outcomes, rather than on time and materials.

Currently, most government procurement works by issuing separate contracts to designers, builders, maintenance, etc. using the design-bid-build procurement process. This puts the government employees in the role of closely monitoring projects, where they hire out and oversee all contractors, using a significant amount of staff time to ensure projects move forward. Under-staffed and under-resourced local and state departments mention struggling to keep up with this work.

Using this traditional method, there are no guarantees that funded projects will succeed. Payments for design-bid-build projects are awarded throughout the project rather than upon delivery of successful outcomes. These projects are broken up into smaller contracts, one for the design, and another for construction elements. It is entirely possible for intermediate steps to be achieved, but for final project goals to remain unmet. This increases risk to taxpayers and keeps the majority of the responsibility for project implementation and success (or failure) on the government.



Pay for Success shifts risk from the public sector to the private, where contractors' payments are based on successfully achieving outcomes like nutrient reductions (a common metric in the Bay). Reliable solicitation cycles create positive signaling to bidders who then help develop a steady pipeline of projects. This model reduces project cost, helping public dollars stretch farther, scale quickly, and helping states achieve their TMDL goals.

Financial Structure

For all Chesapeake Bay Pay for Success programs, the money generally flows the same way: the state, agency, or jurisdiction solicits bidders of all kinds (NGOs, for-profit firms, etc.) to propose projects with a fixed, per-pound nitrogen rate. They choose projects based on a suite of criteria, with the largest points dedicated to cost per pound, and then pay out the contracts once project success is verified.

Payment structures vary among the different programs, but generally, a portion of the funds is paid partway through to reduce the cost of financing and available capital constraints, but the majority of the payment is reserved until project completion.

Enabling Conditions

Maryland's Conservation Finance Act and Clean Water Commerce Act jump-started Pay for Success in the Chesapeake Bay. Having explicit authority to enter Pay for Success contracts helped open doors for other states to follow. Both Pennsylvania and Virginia passed legislation to authorize their programs as well.

The Bay Agreement and TMDL create the pressure for these states to take action. Coupled with the modeling tools available in this area to model nutrient reductions, both the demand and verification needs to run programs like this are being addressed.

Risks/challenges/barriers

Each state is appropriating its own money to fund these programs and is subject to change (or elimination) as a result. Initial success of these programs helps show the legislature how important they are, and with continued rounds of well-priced nutrient reductions, we see this becoming a fixed staple in these states' approach to reaching their TMDL. Virginia is currently operating under a pilot program structure and does not have any future rounds of funding available at this time.

Examples of Pay for Success

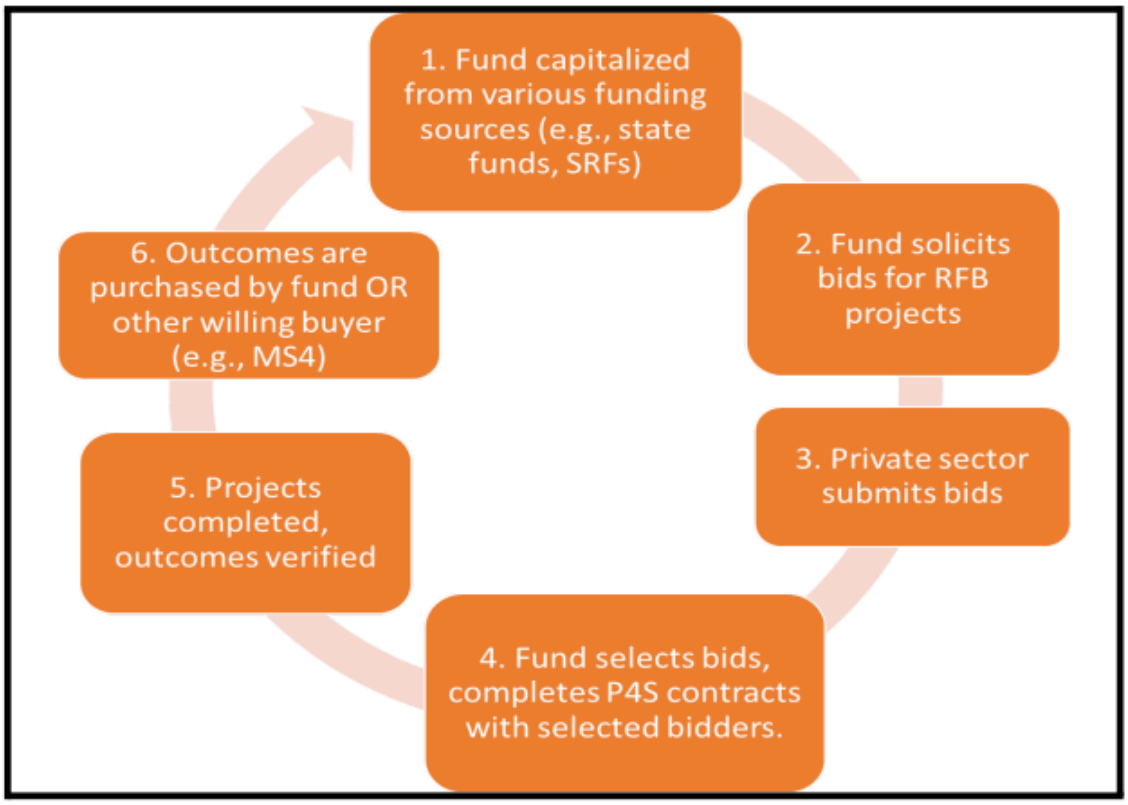
Pay for Success has already been replicated throughout the Bay, with two programs in Maryland, one each in Virginia and Pennsylvania, and another specifically for the Susquehanna River Basin.

A private restoration company was selected under the Clean Water Commerce Program to sell nitrogen reductions generated from a wetland restoration project. The Clean Water Commerce Act (CWCA) is a pay-for-performance contract based on the best value of total pounds of nitrogen removed. The company will transform 13 acres of row-cropped agricultural land in the headwaters of the Manokin River into a non-tidal forested wetland, concentrating on areas with predominantly hydric soils. In addition to nutrient pollution reductions, the project has disaster risk reduction, carbon mitigation, and community co-benefits. This restoration project has a 15-year pay for performance agreement with MDE to ensure that nutrient reduction outcomes are met and serves as a useful example for how pay for performance programs and vehicles could be applied to tidal wetland projects.

Outcomes Funds

EPIC has begun to propose "outcomes funds" as a way to ensure more on-the-ground restoration work can be carried out. Outcomes funds ideally use funding blended from various sources to establish demand and buying power for restoration outcomes; that is, public and philanthropic funding might be pooled together with a limited amount of return-seeking capital, to capitalize the fund and sustain its lean operations. Such funds might be best designed by prioritizing very specific/narrowly-defined outcomes (e.g., acres of tidal wetland restored). Via an RFP process, funds can solicit bids and select the most cost-effective proposals from which to purchase the desired outcomes. The primary purpose of establishing outcomes funds is to send a demand signal to the marketplace to solicit new projects and ensure the presence of a reliable buyer.

EPIC specifically proposed a Riparian Forest Buffers Outcome Fund to help the Chesapeake Bay Program achieve its riparian forest buffer planting goals. We identified that the lack of buying power and demand was slowing progress. Inserting a reliable buyer into the mix would substantially increase opportunities for private sector project developers who have the labor, supplies, and expertise to plant buffers, negotiate with landowners and achieve verifiable outcomes. The fund would solicit bids for cost-effective buffer projects and ink Pay for Success contracts with selected bidders. In the scenario we propose, final outcomes (e.g., acres of riparian forest buffer established) could be purchased directly by the fund itself, or by other willing buyers like MS4s or other third-party buyers.



Environmental Policy Innovation Center, 2023.

Community-Based Public-Private Partnerships (CBP3s)

Community-Based Public-Private Partnerships (CBP3s) are long-term contracts between a public agency and a private partner to plan, execute, and maintain an initiative, usually at a large scale. In the environmental space, they are most commonly used to deliver green infrastructure projects that relate to stormwater or water treatment facilities, and bundle many small projects/goals under a single, outcomes-based contract.

CBP3s, like Pay for Success programs, bundle project delivery under one contract, streamlining the procurement process for all involved. These structures also shift risk onto the prime, private-sector contractor by tying payment to meeting agreed-upon goals, including long-term maintenance. This presents an excellent opportunity to tackle complex projects, often bundling them based on geography, and to inject additional private investment into projects.

Financial Structure

- CBP3s involve two main parties: a public entity, like a water utility or other local jurisdiction, and a private-sector prime contractor. The contractor will often have a suite of subcontractors working on the project as well. It is not unusual for NGOs or local environmental groups to be subcontractors too, usually responsible for long-term maintenance.
- Once the contract is signed, the private partner may need to raise upfront capital to finance the project. Then, the contractor (and their subcontractors) design and implement the project. They are responsible for securing permits and any other necessary compliance standards. The public agency makes payments over time, typically based on milestone triggers like securing permits, X acres planted, etc., and longer-term payments held until environmental results are achieved (gallons of stormwater reduced, pounds of nutrients removed, etc. Funding sources for CBP3s include programs like the State Revolving Funds (SRFs), bonds, stormwater fees, and grants.

Enabling Conditions

A suite of enabling conditions must be in place in order to execute a CBP3 agreement.

- First, the contracting entity must have the legal authority to enter into long-term contracts, using outcomes-based performance measures to trigger payment milestones. In some places, this requires a local ordinance or state law.
- A reliable funding source is also needed, either from predictable revenue streams or from holding available funds until payment triggers are reached.
- Contracts must appeal to the private sector bidders since they are taking on most of the project risk. A host of factors contribute to this, but items like onerous bonding or overly

prescriptive reporting requirements often deter potential bidders. Additionally, clear performance metrics must be determined at the project outset, including how those performance metrics will be measured/verified.

Risks/challenges/barriers

State and local procurement laws may make implementing a CBP3 more challenging. Often, these structures are not expressly legal or illegal, which can cause procurement officers and legal staff to be wary. A study of relevant state and local procurement codes would be necessary before beginning. Providing staff with additional case studies and examples may be helpful to familiarize them with how CBP3s operate.

Another challenge is managing the shift in risk and responsibility compared to traditional contracts. In CBP3s, P stands for Partnership, which is the nature of the relationship between the public entity and the private contractor. Rather than having direct project management responsibility and oversight, the private partner manages the day-to-day. This doesn't mean the public entity relinquishes all control; it's simply a shift to more of a partnership role rather than acting as project managers.

Example of a CBP3

In 2014, Prince George's County, Maryland created the Clean Water Partnership (CWP), a 30-year, $250 million Community-Based Public-Private Partnership (CBP3) with Corvias Solutions, a private company that partners with public sector entities to address environmental and other challenges, to address the county's stormwater regulatory compliance needs under the Chesapeake Bay's Total Maximum Daily Load (TMDL). The 30-year agreement is to retrofit up to 4,000 impervious acres in the County with green infrastructure, with Corvias assuming a role as partner rather than traditional contractor with the County. The CWP represents the first PPP developed to implement the entire project cycle (design, build, finance, operate and maintain) of green infrastructure in order to meet stormwater regulatory requirements of a Municipal Separate Storm Sewer System (MS4) permit.

Under this partnership, Corvias invests its own capital to implement green infrastructure in PG County and is repaid by the County upon delivery of the green infrastructure acres. This arrangement shifts the risk from the public sector (state/local government) to the private sector, with the public sector partner assuming the responsibility of program oversight rather than significant other parts of the project cycle.

The CWP was also designed to have significant equity co-benefits: PG County's contract with Corvias rewards the company with incentive payments based on the number of local small, minority, and women-owned businesses that are subcontracted to deliver services around green infrastructure project implementation. The CWP aims to deliver the project using at least 30-40% local, small, minority, and women-owned businesses.

The initial pilot project under the CWP was successful: 2,000 acres were retrofitted with green infrastructure with significant subcontracting (87%) to local small, minority, and women-owned businesses. In addition, the procurement method of the CWP saved the County more than 40% as compared to status quo procurement methods.

Fees, Taxes, and Bonds

Fees, taxes, and bonds are common as a means for funding restoration. For instance, excise taxes on recreation-related purchases or activities fund large federal grants for wildlife and habitat. The source of tax and fee revenue may be from other industries, including energy, mining, cannabis sales, and state tax form elections (i.e., "check-off" programs). Establishing new tax programs likely requires an act of legislation. Bonds issued by cities and states are often repaid through new tax measures or user fees.

In the case of the Chesapeake Bay, there are already some tax and fee programs generating revenue for restoration. However, it is unclear how much of those programs' revenues have been directed toward tidal wetland restoration. For instance, the US Fish & Wildlife Service grants funding to states from the Wildlife Restoration Program (Pitmann-Robertson Act) and Sport Fish Restoration Program (Dingell-Johnson Act). Those funds, raised through excise taxes, are to be used for habitat and wildlife conservation. While tidal wetland restoration is an eligible use of funds, it is largely outcompeted by other funding needs.

The Chesapeake Bay tourism and recreation sectors could present a few options for new fees to drive revenues to restoration. For instance, cruise ships coming into Baltimore, canoe and kayaking outfitters, and other segments of the recreation economy could add voluntary fees or "round up" programs. Other industries that affect water quality in the Bay or that benefit from cleaner water might also be appropriate for tax or fee programs.

Another way tax programs can support restoration is through tax credits given in exchange for carrying out restoration. Several states have property tax incentives for landowners; in many states, even restaurants that recycle their oyster shells are eligible for tax credits.

Fee and tax programs can generate sustainable revenues over many years, and they can be either voluntary or legislatively mandated.

Financial Structure

Taxes can be collected on income, property or sales. Each state has a different formula for balancing the types of taxes, so more work would be needed to set up any sort of tax program to raise revenues for tidal wetland restoration. Excise taxes are charged on specific types of purchases. Fees, on the other hand, can often be established through a more informal mechanism than legislation.

Enabling Conditions

One of the most important things to identify is to clarify who would be considered a "beneficiary" of clean water, recreation, and Chesapeake Bay natural resources. Connecting the interests of the payor to the ultimate goal of the program is an important way to ensure political will and long term support for a fee or tax. It's also useful to build in simplicity and can be smart to automatically include the fee or tax rather than making it "opt in". That ensures higher rates of participation, but of course, it's also important to garner the public's support for a fee or tax.

Risks/challenges/barriers

Fees and taxes are applicable everywhere and they can be quite scalable. For instance, some of the corporate fee and round-up programs can start small and then grow with more store locations, corporate partners, and award recipients, etc. Long term sustainability is likely one of the most desirable reasons to pursue a tax. Fees might not be as likely to be permanent.

Examples of Fees, Taxes, and Bonds

- In 2021, the City of Virginia Beach issued a bond for $567.5 million to tackle dozens of flood mitigation projects. The bond will be repaid through a 4.3 cent increase in property tax per $100 of home value.
- The state of Montana raises revenue from cannabis sales taxes for a variety of conservation purposes, including specifically the "design, construction, identification, maintenance, and conservation of wildlife crossings and other related crossing accommodations to improve wildlife permeability." This is an example of applying tax revenue on a product (cannabis) is driven to an unrelated purpose (wildlife crossings and connectivity).

Disasters, Settlements, and Restoration Banking

When environmental disasters and contamination occur, funding often becomes available through settlements and other mechanisms. There are a few pathways through which such restoration funding may become available:

1. Disaster funds, such as the Deepwater Horizon Oil Spill settlement are spent over several years to address the impacts of an acute environmental disaster, and much of the funding can support restoration of the natural areas impacted by the disaster event. However, this funding source may only be available following a disaster event, and therefore it is an unpredictable source of funding.

2. Restoration funding may also become available through settlements designed to address legacy contamination, such as with the Rosedale, MD landfill site that was contaminated during the 1950s-1970s and finally resulted in a settlement in 2017. We ran out of time to investigate further, but the Anacostia River Sediment Project and Anacostia River Corridor Restoration Plan is likely also worth further consideration as a potential model or funding source.

3. Restoration banking is the practice of developing restoration credits to offset potential future damages from events like toxic spills and contamination. Natural Resource Damage Assessment and Restoration, or NRDAR, is a process (under the Comprehensive Environmental Response, Compensation, and Liability Act, or CERCLA) through which damage is assessed, and restoration responsibilities are determined. The process can include identifying a "potentially responsible party" (PRP) who may be responsible for covering the costs of restoration, carrying out the restoration themselves; while not common, sometimes PRPs purchase restoration bank credits to compensate for damages they caused. PRPs can be either private or public entities.

While not yet a common practice, restoration banking could help bring financing to restoration in coastal areas. A 2021 Department of Interior memo states:

The terms "restoration banking" and "advance restoration" are not defined in NRDAR regulations, but have been discussed by NRDAR practitioners as referring to: (1) restoration conducted by a PRP after injury has occurred that is "credited" in advance of final resolution of a natural resource damages claim against that PRP ("early restoration"), or (2) restoration undertaken by a party in anticipation of marketing portions of such restoration for mitigation or to address liability for natural resource injury from releases of hazardous substances or oil that may or may not have yet occurred (i.e., restoration "banking"). These best practices are intended to be applicable to both types of "advance restoration" for purposes of the DOI NRDAR Program.

Financial Structure

In the case of restoration banking, a private mitigation banker or restoration company could invest directly into a restoration project that would later be eligible to sell restoration credits that could be purchased by a PRP. Mitigation bankers might primarily generate and sell compensatory mitigation credits to meet Clean Water Act requirements of offsetting damage to wetlands and streams. Those same mitigation banks' credits could also be purchased by a PRP, but only if the trustees overseeing the NRDAR process permit such a purchase.

Enabling Conditions

An important enabling condition for this arrangement is for trustees to permit restoration bank credits to be counted toward meeting a PRP's obligations to restore a damaged site. Furthermore, bankers generally won't find it feasible to speculatively build banks in anticipation of NRDA settlements.

Risks/challenges/barriers

This could be a feasible solution for mitigation bankers who already have mitigation banks in ecosystems that are likely to be appropriate for NRDA-related offsets, but it could be more worthwhile for state or local governments that want to get ahead of damage. It would be a way to recoup expenses in the event there is a disaster settlement.

Examples of Restoration Banking

The best known examples of restoration bank projects are in the U.S. Pacific Northwest, including related to offsetting damage from the Lower Duwamish River Superfund Site and Portland Harbor Superfund Site.[44]

[44] McElfish et al. *Natural Resource Damages, Mitigation Banking, and the Watershed Approach*. Copyright 2018 Environmental Law Institute. https://www.eli.org/research-report/natural-resource-damages-mitigation-banking-and-watershed-approach

State Revolving Funds

What are State Revolving Funds?

The Clean Water Act (CWA) regulates entities that discharge pollutants into the waters of the United States. These entities are primarily point-source polluters such as municipal wastewater treatment plants (WWTPs), Municipal Separate Storm Sewer Systems (MS4s), and publicly-owned treatment works (POTWs) whose pollution levels are specified in National Pollutant Discharge Elimination System (NPDES) permits issued by the EPA or authorized states. Amendments to the CWA in 1987 established the Clean Water State Revolving Fund (CWSRF) program and authorized the EPA to capitalize grants to states for state-administered revolving loan funds, called the CWSRFs.[45] Public Water Systems (PWSs) are regulated by the Safe Drinking Water Act (SDWA); amendments to this Act in 1996 established the Drinking Water State Revolving Fund (DWSRF) for states focused on drinking water infrastructure.[46] The CWSRF and DWSRF are the most significant federal investments into clean water infrastructure in the country - since it was established, the CWSRF has provided $172 billion in water quality infrastructure funding[47]; the DWSRF has provided nearly $50 billion in drinking water infrastructure funding.[48]

The CWSRF and DWSRF funds are capitalized by the EPA and allocated to states according to certain formulas.[49] States play a large role in determining through state legislation and regulation how they will administer the SRFs and have a great deal of flexibility to design the programs' eligibility criteria, priorities, and processes. SRFs are typically administered through state departments of environment or natural resources and operate like banks but provide communities the ability to borrow money at low, below-market rates and benefit from other concessionary financial offerings such as longer repayment periods and principal forgiveness.

The CWSRF program provides low-cost financing to communities for a wide range of water quality infrastructure projects, including municipal wastewater facilities, decentralized wastewater treatment systems, stormwater runoff mitigation, green infrastructure, estuary protection and water reuse.[50] The DWSRF program focuses on improving water systems for public health and compliance with the SWDA. Projects can include installing and upgrading water treatment

[45] Public Law No. 100-4 (02/04/1987): https://www.congress.gov/bill/100th-congress/house-bill/1/text.

[46] Public Law No. 104-182 (08/06/1996): https://www.congress.gov/bill/104th-congress/senate-bill/1316/text.

[47] Environmental Protection Agency CWSRF website.

[48] https://www.asdwa.org/wp-content/uploads/2023/01/ASDWA-A-New-Era-for-the-Drinking-Water-State-Revolving-Funds.pdf

[49] EPA's State and Tribal Assistants Grants (STAG) program receives funding for these programs from annual Congressional appropriations; the Infrastructure Investment and Jobs Act (IIJA) infused additional money into the programs. States are required to provide a 20% match to the capitalization amount

[50] Environmental Protection Agency CWSRF website.

facilities, water transmission and distribution systems, source water, and water storage and system consolidation.[51] Loan repayments (interest + principal) are returned to the SRF, allowing the fund to reinvest revenue or "revolve" funds to additional borrowers.

Historically, the SRF programs have been used primarily to finance "grey" infrastructure projects like wastewater and drinking water treatment systems (aka "pipes and pumps") in their focus on supporting regulated point sources of pollution to reduce pollution rates. The programs also recognize the importance and co-benefits associated with nonpoint source (NPS) projects that involve conservation and restoration of landscapes that have water quality benefits. Examples of NPS projects include green infrastructure, land conservation and restoration projects, and agricultural best management practices (BMPs). While both SRF programs offer vehicles through which to fund nonpoint source (NPS) projects, the CWSRF is the focus of this summary because it holds greater opportunities to fund tidal wetland restoration than the DWSRF in the Chesapeake Bay.[52]

The cost to regulated entities of meeting CWA requirements is expensive, and many communities lack the resources to finance required projects through market-rate loans. The CWSRF plays a part in solving this project by providing low-cost financing and funding for projects that have water quality benefits. Through the CWSRF, the EPA provides broad latitude to states to select project eligibility across PS and NPS project types; wetland restoration is included as an eligible project type in EPA's guidance.[53] EPA also provides information on how nontraditional, NPS projects can receive funding from the CWSRF.[54] However, while projects to reduce nonpoint source pollution can be financed by the SRFs, over 90% of CWSRF finance has been delivered to point source pollution sources.[55] This is due to several factors, including a lower prioritization for green/NPS projects in state SRF Intended Use Plans (IUPs) and a lack of repayment sources for loans to NPS projects. Some land conservation projects have used sustainable timber harvest revenue as a repayment source; similar revenue-generating operations on tidal wetlands are difficult to identify.[56]

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[51] Environmental Protection Agency DWSRF website.

[52] The DWSRF could fund land conservation and other activities for source water protection; this is not likely to apply in the tidal wetland areas of the Chesapeake Bay.

[53] https://www.epa.gov/sites/default/files/2016-07/documents/overview_of_cwsrf_eligibilities_may_2016.pdf

[54] https://www.epa.gov/sites/default/files/2017-05/documents/financing_options_for_nontraditional_eligibilities_final.pdf

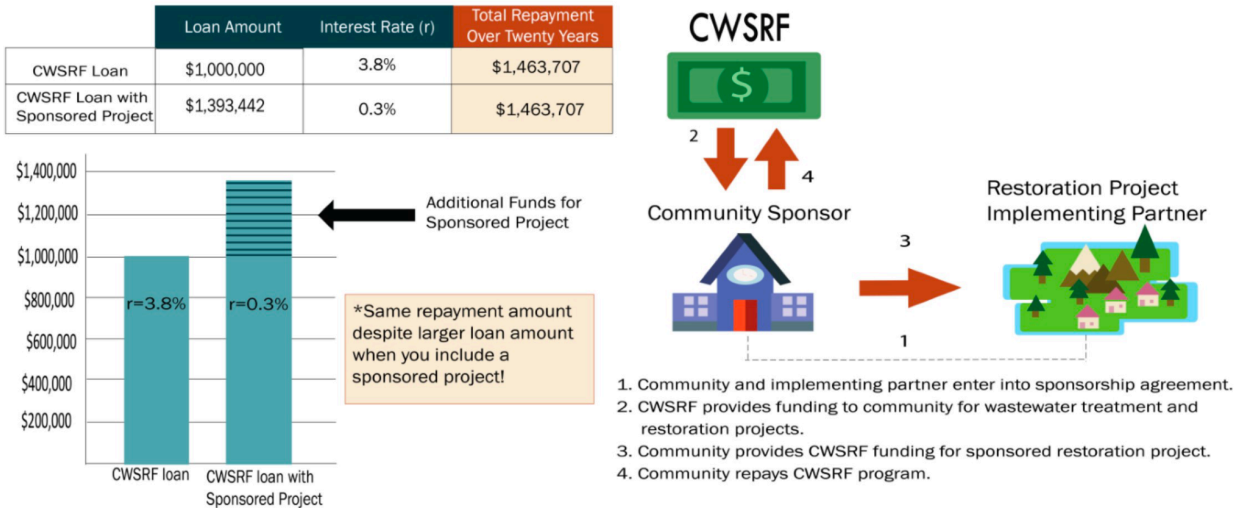
[55] CWSRF data from 1988–2020, National Information Management System Database. U.S. Environmental Protection Agency, 2020.

[56] Ideas for potential repayment sources include recreation and leasing of tidal wetland areas, but have not been researched in depth. However, a recent EPA guide to wetland finance through the CWSRF and DWSRF outlines a number of repayment sources that have been used previously. https://www.epa.gov/system/files/documents/2025-01/cwsrf-dwsrf-resource-guide-for-wetlands-appli.pdf

Within CWSRF lending activities, NPS projects such as tidal wetland restoration can have difficulty with eligibility for direct loans due to lack of a repayment source. Even where these projects have a repayment source, they may not be prioritized within the state's CWSRF program. To counter this difficulty, some states have adopted a "sponsorship" model within their CWSRF program to help allocate resources towards NPS projects.

Financial Structure

The sponsorship model pairs an NPS project (e.g., a tidal wetland restoration project) with a PS project (e.g., a WWTP upgrade) through favorable terms for the PS borrower, most notably a lower interest rate. The forgone interest from the PS project is used to pay for the NPS project, with the PS borrower effectively having the same total repayment over 20 years. The graphic below illustrates how a CWSRF sponsorship program can work.



Source:
https://www.epa.gov/system/files/documents/2023-08/sponsorship_style_newest_final.pdf

Sponsorship activity in the Chesapeake Bay has been evident in Maryland and Delaware.

Enabling Conditions

In order to implement a sponsorship program that could pay for NPS projects such as tidal wetland restoration, the following conditions need to be present:

- States must have authorities that support the sponsorship model. The state CWSRF program needs to have the authority to fund nonpoint source projects, to set interest rates, and to decide how program savings would be used. Some states with existing sponsorship programs, such as Ohio, had this authority in the enabling legislation for the CWSRF. Other states such as Iowa and Vermont first needed to change state statute to expand eligible project types and borrowers.

- States must want to implement a sponsorship model and allocate resources towards it. The state CWSRF program must agree to initiate a sponsorship program within the broader SRF program. States have the authority to make this decision, which can have financial consequences for the balance of the state's SRF fund: potential interest earnings back into the fund are effectively reduced and the amount reallocated to fund the NPS project. Additional staff resources are also required to implement a sponsorship program.

- PS loans must be large. There must be PS borrowers applying for loans large enough to translate into interest payments that make NPS projects financially feasible. While information on minimum loan size to support an NPS project is not currently available, research suggests that at below-market interest rates, loans have to be in the tens of millions of dollars to generate material funding. A $10 million dollar loan at a 3% interest rate, for example, would generate about $300,000 in funding.

- PS borrowers ("sponsors") and NPS sponsored projects must somehow find each other. Even before matches are made, the PS borrowers must be informed about the sponsorship model and knowledgeable about the benefits. PS and NPS projects must be paired during the loan application process so that the CWSRF program can make adjustments and sign loan documents reflecting the reduced interest rate resulting from the sponsored project. NPS project developers must be savvy and also knowledgeable about working with regulated PS borrowers. NPS project timelines and PS loan application and closing timelines must line up in a way that is financially feasible for the NPS project developer.

The EPA recently released a Resource Guide for Wetland Applications to the CWSRF and DWSRF.[57]

Risks/challenges/barriers

Given the long list of enabling conditions above, the number of states with active sponsorship programs is small.

Concerns about federal capitalization of state SRF programs may also preclude states from initiating sponsorship programs. While the amount of assistance available through the SRFs increased substantially from the IIJA - state programs received $11.7 billion in new CWSRF money

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57 https://www.epa.gov/system/files/documents/2025-01/cwsrf-dwsrf-resource-guide-for-wetlands-appli.pdf

- these levels will decrease, both due to IIJA funds running out and due to potential budget cuts to federal allocations to the SRF programs.

Every state can in theory develop a sponsorship program. However, certain Bay states are more poised than others to do this (see table below). Research to date indicates that Maryland holds the opportunity to implement a more robust sponsorship program through its CWSRF. The state's Conservation Finance Act (CFA) requires WIFA to "...establish a sponsorship program that allows a local government to serve as the primary borrower and receive a loan for a publicly owned treatment works project at a reduced interest rate if the loan also includes financing for a sponsored nonpoint source project managed by an organization." While the state was already allowed to implement a sponsorship program, the CFA requires the program.

Tidal Jurisdiction	Clean Water SRF Program	Notes on the Relative CWSRF Opportunity for Tidal Wetlands
DC	Clean Water Construction Grant Program (DOEE)	Unlike most states, D.C. and the U.S. territories receive their CWSRF funding as grants directly from the EPA, rather than establishing a revolving fund. The EPA provides funding for D.C.'s Clean Water Construction (CWC) program, which can cover up to 80% of a project's cost. Stormwater green infrastructure is an eligible project type. DC has not implemented a sponsorship program.
MD	Water Quality Revolving Loan Fund (MDE)	MD funded one of the first NPS projects in the country. The CFA requires the state to implement a sponsorship program.
VA	Virginia Clean Water Revolving Loan Fund (VA DEQ)	VA has a requirement that all PS loans are fulfilled before NPS loan applications are considered. Demand for PS loans currently exceeds supply, meaning that NPS projects are unlikely to receive loans. VA has not implemented a sponsorship program. One promising non-sponsorship vehicle to provide NPS loans is the Middle Peninsula Planning District Commission's Living Shoreline Revolving Loan Program for homeowners in the six-county district along the Bay. The program is called the Shoreline Resiliency Program and provides low-interest financing to establish living shorelines. The Program has had high interest from small business owners along the coast who rely on working waterfronts.

DE	Delaware Water Pollution Control Revolving Fund (DE DNREC)	There is evidence that DE has a sponsorship program; research into the program is ongoing. The Delaware CWSRF loaned $2.9 million to the Delaware Department of Natural Resources and Environmental Control (DNREC) Division of Waste and Hazardous Substances to create two acres of wetlands by replacing 29,000 tons of soil contaminated with zinc with clean fill material and topsoil. The loan was repaid using Hazardous Substances Control Act tax revenues and an MOU giving DNREC the right to withhold HSCA tax revenues to pay annual CWSRF lease payments.

Making these funds more accessible for tidal wetland restoration will require:

- Working with fund administrators at the state level to establish a sponsorship program.
- Educating both the regulated community and tidal wetland restoration project developers about SRFs for project funding.
- Identifying other mechanisms through which tidal wetland restoration might be funded in the Bay tidal jurisdictions (e.g., Virginia's Shoreline Resiliency Program).

  Sustainability of funding source: How certain is this funding source over time?

SRFs are a relatively stable source of funding for water infrastructure in states, and sponsorship projects can happen even with variations in federal capitalization allocations. Ohio's sponsorship program generates about $15 million in annual funding, which is a cap established by the program. However, funding tidal restoration projects specifically will require education of both PS sponsors and NPS project developers on feasible pairings if and when a sponsorship program is launched in a particular state.

Examples of SRFs for restoration

States that have implemented CWSRF sponsorship programs include Delaware, Idaho, Iowa, Ohio, and Oregon. Ohio's program (the Water Resource Restoration Sponsor Program or WRRSP) was the first NPS sponsorship program (established in 2000) and the most robust: the program has dedicated staff and an online registry to match PS and NPS projects.[58] Ohio's program was born of the need to address wetland loss and stream restoration needs (with no ready source of funding available) alongside the need to upgrade regulated PS pollutant sources. The program makes available up to $15 million per year ($4 million per project) for sponsored NPS projects. In 2018, a $142 million CWSRF loan to the Northeast Ohio Regional Sewer District generated a $1.3 million sponsorship package for the Western Reserve Land Conservancy/Natural Areas Land

[58] Ohio WRRSP Implementer/Sponsor Registry: https://dam.assets.ohio.gov/image/upload/epa.ohio.gov/Portals/29/wrrsp/Implementer-Sponsor-Table.pdf.

Conservancy. The $1.3 million sponsorship was used to buy 64 acres of land on western Lake Erie (Bay Point) including 34-acres of shoreline wetlands.[59]

Corporate Engagement & Partnership

Various companies have initiatives (e.g., Sustainability, Corporate Social Responsibility and Environmental, Social, Governance) through which they commit financial and staff resources to improving either their direct impact on the environment, or their general standing as responsible corporate citizens. They often set goals and targets such as "net zero" or "carbon neutral," which drive them to reduce emissions, increase efficiency, sponsor nature-positive projects, and purchase carbon or other offsets.

Companies like Patagonia developed the 1% for the Planet initiative that has driven hundreds of millions of dollars in donations to environmental projects. 1% for the Planet is a corporate giving program through which participating companies donate 1% of annual sales to select recipients.

Corporate engagement in restoration is largely voluntary, based on a company's priorities and strategic alignment with certain types of outcomes. The level of financial support and interest in carrying out nature-based projects varies widely. Some companies have tasked themselves with achieving fully net-zero impacts, while others simply invest in small projects in their backyard. With growing impacts from new data centers, now is an especially interesting time to pursue corporate support from companies that are feeling the pressure to offset those new impacts and preserve their reputation as responsible corporate citizens.

The Chesapeake Bay region is home to a range of business interests, who present an opportunity for corporate partnership. Through identifying local companies with a vested in the health of the Chesapeake Bay, it could be possible to launch a corporate giving program like 1% for the Planet with several local businesses.

Financial Structure

Corporate engagement could take many forms; aligning the use of funding or other support with a corporate's interests is the best way to pursue a partnership. It might be possible to tap into corporations' demand for biodiversity credits. If upfront funds were available, a project developer could carry out a tidal wetland restoration project with high biodiversity uplift and apply a respected biodiversity metric to calculate the uplift and price credits. Credits from such a project could be marketed directly to corporates who are active in the Chesapeake region.

Enabling Conditions

Corporate engagement relies entirely upon the interests of the corporate partner and their willingness to apply resources to go above and beyond through voluntary restoration and

[59] https://www.epa.gov/system/files/documents/2025-01/cwsrf-dwsrf-resource-guide-for-wetlands-appli.pdf

environmental protection practices. Some companies have made such commitments very public, especially through coalitions like Business for Social Responsibility and Ceres, and pledges like The Climate Pledge.

Risks/challenges/barriers

The biggest barrier or challenge in the corporate engagement opportunity is simply finding the match with an interested company, or suite of companies. Unlike grant programs, they usually don't have publicly available information about specific corporate partnership opportunities accepting proposals. Therefore, it can be a time intensive process to find a fit with an appropriate corporate partner. Likewise, the size and scope of a potential financial partnership is unknown and requires relationship-building. This is why credits can be an especially useful tool in soliciting funding from companies that wish to offset their impacts; they offer a marketable product that makes it easy for corporations to voluntarily engage with directly.

Examples of Corporate Engagement

One case study that specifically relates to coastal restoration comes from Puerto Rico via a Philadelphia Eagles carbon offset program: "In 2023, with the help of The Ocean Foundation and Ocean Conservancy, the Eagles offset 100% of their team travel carbon emissions through seagrass and mangrove restoration in Puerto Rico's Jobos Bay National Estuarine Research Reserve. The Eagles are the first U.S. professional sports team to offset team travel through the support of the Ocean Conservancy's Blue Playbook."

Mentioned above, 1% for the Planet is an excellent example of a long-standing corporate environmental giving program that has generated hundreds of millions of dollars for its recipients.

Financing Tidal Wetland Restoration in the Chesapeake Bay:

A How-To Guide for Jurisdictions

October 31, 2025

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Introduction

This How-To Guide offers suggestions for steps jurisdictions can take toward operationalizing the funding and financing approaches covered in the Innovative Finance Summary Report submitted in the previous deliverable.[60] More detail on leveraging the various resources covered will be provided in the Leverage Strategy deliverable as well.

This How-To Guide includes funding and financing sources that run the gamut from very straightforward to more complex and vague. For instance, competitive state and federal grant programs are likely already quite familiar to tidal Chesapeake Bay jurisdictions. These programs typically make clear the amount of funding available, clarify who is eligible to apply, outline a very prescriptive application process, identify appropriate uses of the funding, and may run on a predictable schedule. On the other hand, insurance tools, public-private partnerships, restoration banking, and corporate partnerships are less clearly defined. These latter tools are also quite varied, and implementing them will depend upon first assessing their appropriateness and feasibility based on a range of factors: the scale and type of the funding need, the presence or absence of partner capacity, compatibility between the funding approaches and specific tidal wetland restoration goals, political and public support, and more. Jurisdictions considering the tools below will benefit from first taking stock of existing resources and networks, researching examples and case studies, conducting a feasibility study, and otherwise becoming familiar with the approaches.

This How-To Guide aims to give helpful tips regarding when and how to take advantage of the tools listed and shares relevant resources for learning more and getting help from existing sources. We also include a list of recommendations at the end, which could help make the process of identifying, selecting and implementing innovative finance approaches easier and faster.

Competitive Federal and State Grants

A wide range of federal and state funding for conservation and restoration is available through competitive grant programs across the tidal Chesapeake Bay jurisdictions. The Tidal Wetland Funding & Financing Inventory prepared as a deliverable for this project includes information on the programs that have tidal wetland restoration as an eligible project type. The Inventory is a living document; to date it contains over 45 funding programs (these include some loan-based programs as well) and additional programs are continuously being added. Once complete, the Inventory will serve as a tool for the tidal Bay jurisdictions and other project proponents to use to navigate these funding sources.

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[60] We ultimately plan to combine the Summary Report, this How-To Guide, and the Leverage Strategy into a single resource that is easy for readers to navigate.

This How-To Guide provides the following steps a jurisdiction and/or project proponent can take to use the Tidal Wetland Funding & Financing Inventory tool:

- Identify your eligibility for a particular funding source in the Tidal Wetland Funding & Financing Inventory Tool. Competitive federal and state grant programs have different requirements for applicant eligibility and project type eligibility. The sources included in the Inventory have all contributed to tidal wetland projects but not all of them directly fund restoration and some are focused on the design phase while others fund implementation (and some will fund all phases of a project cycle). The Inventory provides information on the types of projects and phases of the project cycle that are funded. Some funding sources such as loan programs for dredging are included because they can be paired with tidal restoration grants. These innovative combinations will be included in the Leverage Strategy.

- Identify match requirements. Some grant programs require the project proponent to have a specific amount of match funding. The Inventory provides information on match requirements. Project proponents must ensure they can locate sufficient match funding to meet program requirements. The Leverage Strategy will include information on creative sources of match that have been implemented in some tidal wetland projects.

- Understand the application processes. Competitive grant programs have different application processes, including narrative and technical requirements for the proposal and grant cycle dates. The Inventory provides information on where to look for these elements through providing program website information and contact information for key staff working on the program. Project proponents should visit the program website, review recent information, and check for upcoming webinars or technical assistance available for potential grantees.

- Understand previously funded projects and grantees. A very useful source of information on the program website is previous grant slates that describe the types of projects that have been funded in previous funding cycles, who the grantees have been, and the size of the grants. This information can help potential applicants understand how their proposed project aligns with previous priorities and components of successful grants. Potential applicants can also identify entities that have been previously awarded - these entities could be sources of helpful information on the program as well as potential future partners in a joint application for funding.

- Contact the program staff with any questions on program details or eligibility requirements. The Inventory provides contact information for key staff working on the included funding programs, many of whom EPIC spoke with and continues to speak with for this project. These staff can be extremely helpful to potential applicants in navigating the funding program and requirements.

- Contact any technical assistance providers available for the funding program. Some funding programs have their own technical assistance - such as NFWF's technical assistance for its Chesapeake Bay Stewardship Fund - and some programs have external technical assistance available, such as the assistance available in navigating the State Revolving Loan Funds (SRFs) through the Region 3 Environmental Finance Center in Maryland.

Insurance

Insurance currently has a lot of momentum in the nature-based solutions and resiliency spaces. This is an evolving field where new products are emerging and being piloted in multiple ecosystems and to address different threats. Insurance products could support more investment in tidal wetland restoration in a number of ways as described in the Innovative Finance Summary Report, including by reducing flooding and other risks that impact homeowners' home and flood insurance (home insurance usually exempts floods; flood insurance is usually purchased as a separate policy). For instance, homeowners might be willing to pay for an insurance policy in exchange for realizing savings on insurance premiums, and insurance companies benefit if the number or size of claims is reduced. Actual restoration projects might also be eligible for insurance, which can provide a source of funds for repairing damages to the restoration project.

This How-To Guide suggests a series of steps jurisdictions and/or project developers can take to understand whether and how insurance might be a source of risk reduction and/or funding for tidal wetland restoration projects.

- Understand the hazards and potential damage from hazards a tidal wetland area faces. Identifying the types of insurance that could be useful starts with understanding the hazards that can impact wetlands in a particular geographic area. Hazards to tidal wetlands in the Bay include changing environmental conditions such as increased severe weather events, and warming waters; land-based nutrient and sediment pollution; coastal development; and invasive species. After understanding the hazards, it is important to understand the potential damages to tidal wetlands from these hazards, both in terms of scope and scale, and the probability of these damages occurring. Insurance makes more sense for events that are lower probability but have high potential damages. Otherwise, funding allocated to premium payments could be sufficient to cover the cost of mitigation or recovery post-damage.

- Understand the benefits a tidal wetland area provides. Tidal wetlands can provide coastal resilience and flood risk reduction benefits to coastal properties. For example, one study estimated that coastal wetlands prevented $625 million in flood damage from Hurricane Sandy. Where this information is quantified through tidal wetland ecosystem valuation, coastal property owners may be able to realize savings on their insurance premiums and insurance companies may realize savings on claim payments. A recent pilot on Dauphin Island, Alabama is one of the first cases in which coastal restoration is being tested to see if

coastal resiliency benefits can be used to reduce home and flood insurance premiums. In this case, the tides and water levels were measured before and after marsh restoration to estimate flood risk benefits. The data are currently being shared with homeowners, who will share the information with their insurance providers.

Tidal jurisdictions in the Chesapeake Bay could ask or require that tidal wetland restoration projects take these kinds of before/after measurements (if they are not already either formally or informally) to support potential home and flood insurance benefits for coastal property owners.

- Identify potential types of insurance that could deliver funding to tidal wetland protection and restoration. Depending on the hazard profile of tidal wetland areas, different types of insurance may be more feasible. Parametric insurance, described in the Innovative Finance Summary Report, is useful in contexts in which there is a clear, discrete, measurable triggering event (e.g., wind speed from a storm) with a probability of occurrence that justifies the premium. Where there are community benefits to tidal wetland protection and restoration, community-based models (described below) may be feasible.

- Identify potential policyholders. An insurance policyholder must have the willingness and also the insurable interest to hold a particular policy. Insurable interest requires that the policy holder would experience financial loss or hardship if the insured item were damaged. Tidal wetland areas can be private or public (or a mix on a single property) depending on state property laws. In Maryland, for example, State tidal wetlands are areas below the mean high tide line and impacted by tidal action while private tidal wetlands are lands not considered State wetlands. Private landowners would hold insurable interest for private tidal wetland areas, while the State would hold this interest for State tidal wetland areas. Local jurisdictions can have purview over tidal wetlands as well, such as through Maryland's Tidal Wetlands Act, and could potentially serve as policyholders on their own or on behalf of communities.

- Identify potential sources of funding for insurance premiums. The policyholder does not have to be the source of payment for the insurance policy. Payments for insurance policy premiums can be paid for from multiple sources, such as individuals, groups of individuals or businesses, or in some cases public entities, depending on who benefits from the policy. In Maryland, some local governments participate in the Local Government Insurance Trust (LGIT), a nonprofit "insurance" structure that the local governments contribute to, manage and own.

- Consider the potential for community-based catastrophe insurance (CBCI). The community-wide benefits tidal wetland restoration projects have can support community-based insurance efforts. In CBCI initiatives, a community can be a public entity or agency, or a special purpose district that arranges insurance for community members to cover a group of properties. CBCI models can cover one or more hazards, including floods and wildfires. CBCI models vary from voluntary to mandatory, and from assistance with helping community members arrange insurance with existing insurance providers to

insurance vehicles created by the community to fund risk reduction projects or recovery projects post-disaster. The pooled nature of these models can increase community resilience in the face of disasters, reduce the costs of coverage for members, and create incentives to implement risk reduction measures within the community. Where the costs and benefits of investing in tidal wetland protection and restoration have been quantified, pooled resources that may have been used for rebuilding post-disaster can be used for risk reduction.

- Engage with insurance companies active in the insurance for nature space. Several insurance companies have been working with public and private entities to develop insurance products that support protection and restoration of ecosystems. Local jurisdictions can identify companies with operations in their state and begin conversations with them about the possibilities of insuring tidal wetland areas against threats. Some recent notable examples include:
    - Focused on the mitigation market, Great American provides insurance to wetland and other ecosystem restoration projects.
    - MunichRe in involved in parametric insurance products, such as with the coral reef parametric insurance policy in Hawaii.
    - NatReCo's Restore policy provides insurance for restoration projects up to 5 years for the project phase. NatReCo is also developing other policy products for the management and conservation phases of a project.

Pay for Success

Pay for Success (PFS) is a contracting approach that ties payment to the achievement of predefined environmental outcomes. Compared to traditional grant funding, PFS structures require:

- Clear, measurable performance metrics tied to environmental benefits (e.g., nutrient reductions, restored acres, gallons of water stored);
- Private or philanthropic capital to finance implementation upfront; and
- Quantification and verification that outcomes were achieved before the majority of public dollars are disbursed.

By shifting performance risk from the government to the contractors, PFS allows public agencies to focus resources on results rather than direct oversight and project management.

Using existing Bay Program metrics, PFS creates a pathway for government agencies to fund tidal wetland restoration projects based on measurable ecological outcomes directly tied to goals. This

mechanism is especially well-suited to projects where outcomes can be quantified but take time to materialize, common in wetland restoration.

Launching a PFS contract requires:

- Geographic boundaries that determine an appropriate managing entity
- Quantification tools and the ability to model potential projects' outcomes
- Legal contracting authority to structure performance-based payments
- Communication strategies to announce the program and attract bidders

The Chesapeake Bay region is particularly well-suited for Pay for Success (PFS) approaches to tidal wetland restoration. First and foremost, the Bay jurisdictions already operate under a shared set of restoration and water quality goals through the Chesapeake Bay Program. All Bay states have agreed upon these goals and scientific models and monitoring protocols back them. This existing consensus makes it far easier to define the kinds of measurable outcomes a PFS contract would require and reduces the administrative burden of building new metrics from scratch.

In addition, several jurisdictions in the region have already launched PFS models in the environmental space. Virginia's Department of Environmental Quality has piloted a nutrient reduction PFS structure to deliver verified reductions. Similarly, Maryland's Clean Water Commerce Program has purchased over 3.6 million pounds of nitrogen reductions through PFS. These efforts provide not only technical templates and early lessons learned, but also show that state-level agencies and the bidding community in the region are already familiar with the mechanics of performance-based contracting. For any agency considering PFS for tidal wetland restoration, this means you're not starting from zero. There's a growing network of practitioners, service providers, and funders in the Bay area who are already engaged in this work.

The Bay region also offers compelling reasons to think at scale. Tidal wetlands cross jurisdictional boundaries. A Baywide or multi-state PFS tidal wetland effort could capture these broader benefits more efficiently than fragmented, state-by-state approaches. A shared structure could help pool funding sources, standardize outcome definitions, and allow states to participate based on their specific restoration opportunities. If an individual state approach were taken, legislation may be needed to authorize these contract types and vetting processes through state legal and procurement staff.

Finally, the Bay region's strong civic and nonprofit ecosystem presents promising opportunities for aggregation. Many tidal wetlands in the region are adjacent to or managed by community organizations, land trusts, or even Homeowners Associations (HOAs). These smaller parcels might not justify individual contracts on their own, but bundled together, they could create a large-scale restoration portfolio attractive to private investors and capable of delivering meaningful outcomes. These aggregating intermediaries could help manage this complexity, facilitating a program that reduces the landowner management burden on state agency staff.

In short, the Chesapeake Bay region already has the goals, the metrics, the early programs, and the institutional infrastructure to support a successful PFS model for tidal wetlands. What remains is to connect these elements into a coherent, outcome-focused funding program, something that PFS is uniquely positioned to do.

Potential Next Steps

1. Familiarize with Existing PFS Pilots: Review program structures and contract examples from Virginia and Maryland
2. Decide on Scale and Structure: Consider whether this is best advanced through a Baywide coordinating entity (like the Chesapeake Bay Trust) or a state-specific program.
3. Identify a Wetland-Specific Outcome: Review the existing bay goals and determine the appropriate metric to tie PFS payments to. This simplifies the verification process and helps build early buy-in.

By leveraging PFS to fund tidal wetland restoration, agencies can unlock new capital, de-risk investments, and ensure that public dollars deliver verified ecological benefits.

Community-Based Public-Private Partnerships (CBP3s)

Community-Based Public-Private Partnerships, or CBP3s, are long-term, performance-based contracts between public agencies and private entities designed to deliver environmental infrastructure—like stormwater retrofits and wetland restoration—at scale. Compared to traditional project-by-project contracting, CBP3s allow for:

- A single, multi-year agreement to deliver a portfolio of projects
- Greater flexibility in implementation, enabling adaptive management
- Private sector efficiencies and access to upfront capital
- An intentional focus on community engagement and local workforce development

CBP3s are particularly well-suited to large-scale environmental restoration efforts where long-term planning, economies of scale, and predictable funding pipelines can drive down costs and improve results. For tidal wetlands, this structure can help agencies deliver dozens—or even hundreds—of restoration acres over time, without needing to procure and manage each individual project.

How is this different from Pay for Success?
While CBP3s and Pay for Success (PFS) contracts emphasize performance and long-term outcomes, they differ in structure and goals. PFS contracts are usually for one desired outcome, like a pound of nitrogen removed from a watershed or a gallon of water stored. In contrast, CBP3s focus on bundling and efficiently delivering large volumes of restoration projects of different types

through a single, long-term contract. Social goals, like workforce development or recreation, are also often included. Payments for both PFS and CBP3s are tied to reaching specific goals or outcomes, although CBP3s usually have many milestone payments throughout the contract, while PFS is primarily held until project completion.

To stand up a CBP3 model, agencies typically need:

- A defined project pipeline or restoration target to justify scale
- Legal authority to enter into long-term contracts (often 10+ years)
- Internal champions and leadership willing to pursue innovative approaches
- Access to capital or financing tools, often through public funds or private partners
- A clear framework outlining roles, responsibilities, and performance tracking

The Chesapeake Bay region is a natural fit for CBP3 implementation, especially for tidal wetland restoration. Bay states share ambitious restoration targets under the Chesapeake Bay Program, and tidal jurisdictions across Maryland, Virginia, and Delaware already face significant restoration obligations. A CBP3 approach allows these obligations to be met more efficiently through a single entity responsible for design, permitting, implementation, and maintenance across multiple projects and geographies.

The region has already demonstrated the viability of CBP3s in related sectors. Prince George's County, Maryland, pioneered the model to retrofit thousands of acres of impervious surface for stormwater compliance, creating jobs and generating measurable environmental outcomes. This example serves as a playbook for other Bay jurisdictions, offering lessons on contract structure, community hiring provisions, risk-sharing, and performance metrics. While no CBP3s have been applied directly to tidal wetland restoration, that we're aware of, the foundation is in place.

Importantly, the Bay's existing coordination mechanisms and restoration goals make aligning a CBP3 effort with region-wide objectives easy. The Chesapeake Bay Program's established science and modeling infrastructure reduces the burden of creating new performance tracking systems from scratch. The scale of the Bay's tidal wetland needs—paired with growing pressure to show progress on resilience, habitat restoration, and flood mitigation—provides the kind of multi-benefit project portfolio ideal for a CBP3.

Aggregation is another key strength of the CBP3 approach. Many tidal wetland sites are small and fragmented, making them difficult to implement through standard procurement. A CBP3 allows these to be bundled into a larger delivery vehicle, reducing transaction costs and allowing agency staff to focus on oversight rather than day-to-day project management. Local partners like community-based organizations, restoration contractors, and even HOAs can be subcontracted as implementers, ensuring local buy-in while scaling impact.

CBP3s offer a practical path for delivering tidal wetland restoration at scale, especially in jurisdictions with strong restoration mandates, limited staff capacity, and a desire to integrate equity and workforce development goals into their work. The Bay region has the enabling conditions, governance frameworks, and real-world experience needed to adapt this model to coastal systems.

Potential Next Steps

1. Review Existing CBP3 Programs: Study the Prince George's County model and related efforts to understand how long-term restoration contracting can be structured and financed.
2. Assess Project Pipeline & Scale: Determine whether the scale of restoration needed justifies a bundled delivery approach.
3. Engage Legal & Procurement Staff: Explore what contracting authorities or legislative changes might be required to authorize multi-year, performance-based contracts for the administering body.
4. Identify Community Partners: Begin conversations with potential bidders and community organizations who could play roles in project delivery or outreach.

Fees and Taxes

When designing a fee or tax program to fund restoration efforts, one approach is to directly align the source of revenue with the beneficiaries, for example, involving entities that have an interest in avoiding the costs associated with wetland degradation or that stand to benefit from wetland restoration. In the Chesapeake Bay region, for instance, the fishing industry depends on healthy tidal wetlands to sustain fisheries, while the real estate sector benefits from the flood protection these wetlands provide. However, it's unknown if those sectors would support higher fees or taxes for restoration purposes. In Montana, a 20% cannabis sales tax passed by referendum when cannabis was legalized statewide funds conservation and other purposes in the state. The tax applies to all sales of recreational cannabis (so it only impacts people who purchase recreational cannabis products).

Alternatively, fees and taxes can be levied on a larger target population, such as across the entire municipality, county or state. There is also an option to create special districts, such as multiple counties together. In 2024, the Trust for Public Land tracked eleven states that passed a range of municipal and county ballot measures to fund open space, wildlife habitat, watershed protection and more, through bonds, real estate transfer taxes, and sales taxes.

The Chesapeake region already has some restoration and coastal infrastructure funding derived from fees and taxes. However, we are not suggesting that existing funds are repurposed away from their current uses.

- Maryland's Chesapeake and Atlantic Coastal Bays Trust Fund is funded by tax revenues from gas and rental car taxes. It is a water quality fund aimed at reducing nitrogen, phosphorus, and sediment pollution, while also supporting co-benefits like wildlife habitat, funding projects in disadvantaged communities, and addressing urban heat islands. Applicants for the funding should have permits secured and be capable of carrying out construction within a reasonable timeline. Applicants often pair this funding with other funding for earlier-stage project readiness.
- Maryland's Waterway Improvement Fund is funded by a 5% excise tax on boat purchases in the state. Funding supports boating infrastructure such as ramps, marinas, dredging and more.

Next steps

Assessing the need and opportunity for a tax or fee program could include several main steps:

1. Clarifying the purpose of the funding: What are you planning to do or make possible with funds from a bond, tax, trust fund?
2. Assessing the amount of funding needed to address either part or all of the restoration goal.
3. Gaining the support (or at least neutrality) of elected officials. This helps not only for purposes of a public campaign, but also for entering into technical assistance agreements or other planning steps.
4. Identifying who will carry out the direct engagement "on the ground," that helps vet the opportunity, carry out due diligence, and ultimately lead a campaign for broad support.
5. The Trust for Public Land's Conservation Finance program and The Nature Conservancy's Conservation Campaigns program provide advising and support related to voter referendums to support funding for conservation. They would be able to support interested jurisdictions that want to understand the feasibility of a tax or bond initiative to fund–or support financing for–local restoration.

Disaster Funding & Restoration Banking

Based on our review of this potential funding source, we don't expect it to be highly fruitful for funding tidal wetland restoration. However, future disasters would likely result in the provision of new settlement funds that are appropriate for a range of coastal restoration efforts, so it is worth considering how best to prepare to make use of this eventuality. Forethought could help line up project ideas sooner rather than later and reduce the lag time between a disaster and on-the-ground restoration.

Two sources of disaster funds include Natural Resource Damage Assessment and Restoration (NRDAR), handled by Fish & Wildlife Service or NOAA, and Impact-Directed Environmental Accounts ("IDEA"), handled by the National Fish & Wildlife Foundation (NFWF). NRDAR is a process (under the Comprehensive Environmental Response, Compensation, and Liability Act, or CERCLA) through which damage is assessed, and restoration responsibilities are determined. The process can include identifying a "potentially responsible party" (PRP) who may be responsible for covering the costs of restoration, or carrying out the restoration themselves; while not common, sometimes PRPs purchase restoration bank credits to compensate for damages they caused. IDEA funds are derived from penalties, court orders, settlements, regulatory permits, and other sources, and then directed toward restoration and remediation projects.

As a next step, Chesapeake region stakeholders could convene a discussion, workshop, conference, or other type of convening on disaster funding and restoration banking. Restoration professionals, including experienced mitigation bankers, federal and state agency representatives, and local jurisdictions, could jointly explore opportunities to prepare to take advantage of disaster funding in the event it becomes available.

State Revolving Funds

The Clean Water and Drinking Water State Revolving Funds (CWSRF and DWSRF) are state-level funds capitalized by the EPA and allocated to states through formulas. States are required to contribute 20% match to the funds, which provide low-cost financing to communities to implement projects for compliance with the Clean Water Act (CWA). States have latitude through legislation and regulation on how they administer their SRF program - for example, the program's eligibility criteria, priorities for funding, and loan terms (e.g., the interest rate, repayment periods, offering principal forgiveness). States can also implement sponsorship programs to enable the SRF program to deliver funding to nonpoint source (NPS) projects that don't have a repayment source.

The CWSRF holds more opportunity for tidal wetland restoration funding - the nexus for the DWSRF is drinking water source watersheds so not very relevant to tidal wetlands. Within the CWSRF, there are two primary ways in which a tidal wetland restoration project could access funding: apply for a traditional SRF loan, or participate in a sponsorship program if offered by the state. It is important to note that while there is federal guidance on SRF program administration (for example, establishing that mitigating nonpoint source pollution is an eligible project type), SRFs differ in each state - understanding the specific rules and priorities of the state in which a project is being proposed is critical.

Option 1: CWSRF Loan Application

The steps a tidal wetland project developer could take in applying for a CWSRF loan are:

1. Review state program criteria. State program criteria differ. Review the timeline for application in your state and the scoring criteria and eligibility requirements for your state. Key documents to review are the Intended Use Plan (IUP) and the Project Priority List

(PPL). The IUP is an annual document that outlines the state's process for ranking projects, selecting projects, determining affordability criteria and criteria for principal forgiveness, and includes a list of all projects that have applied for funding in that year. The PPL reflects a subset of the projects in the IUP that the state is intending to fund in that year. The states are required to hold a public comment period for the public to respond to both the IUP and PPL. These documents are available on the SRF program websites for each state - reviewing them can provide information on the priorities and processes of your state.

2. Connect with technical assistance providers who help navigate SRF funding for potential applicants. For example, the assistance available in navigating the State Revolving Loan Funds (SRFs) through the Region 3 Environmental Finance Center in Maryland.

3. Contact SRF program staff. Review your state's SRF website and contact the program staff regarding questions

4. Map project design against scoring criteria and loan requirements. This includes estimating the pollution reduction benefits of a project, project cost, source of repayment and other aspects.the

5. Identify repayment sources: State SRFs provide flexibility around repayment sources. Repayment sources for NPS projects can be more difficult to identify but have included sustainable forestry revenues and revenues associated with recreation activities. SRF loans cannot be repaid through other federal sources of money.

Information below is state-specific to guide potential engagement with the state CWSRF programs loan applications.

District of Colombia

- Email Program Manager, Jeff Oser (jeff.oser@dc.gov) to be placed on an email list for funding announcements.
- Check DOEE Clean Water Construction Grant website for annual Request for Applications (typically in March or April).
- Application requires a letter of permission from the property owner to perform work (projects must be implemented on public land).
- Estimate project cost and identify local match: DC grant program requires 20% match.
- Develop and submit proposal.

Maryland

- Check the Maryland Water Infrastructure Financing Administration website for updates and to review recent and past IUP and PPL documents.

- Review MDE's Integrated Project Priority System for Water Quality Capital Projects Point Sources and Nonpoint Sources to understand evaluation criteria. This document provides water quality benefit information for wetland restoration, creation, and rehabilitation projects.
- Submit an application to MDE; the open period for applications is from December 1 to January 31 each year.

Virginia

- Check the Virginia Clean Water Revolving Loan Fund (CWRLF) website for updates and to review IUP and PPL documents.
- Wetland restoration is included under the Agricultural BMPs eligible project area. Living shorelines and the creation of funds for communities to establish living shoreline loan programs are also eligible and could support tidal wetlands. Point source projects must be funded before nonpoint source projects are considered; this limits the ability of projects such as tidal wetlands to be funded. Tidal wetland restoration could also be considered for land conservation projects; however the CWRLF notes that "funds for financing land acquisition can only be available in fiscal years when there is a balance remaining after the VCWRLF has satisfied all eligible loan requests from local governments for wastewater facility improvements."

Delaware

- Check the Delaware Water Pollution Control Revolving Fund website for updates and to review recent and past IUP and PPL documents.
- The funding process starts each year in January with an invitation to eligible projects to submit Notices-of-Intent (NOIs) to apply for funding.
- The only potential borrowers for tidal wetland restoration projects are municipalities or counties; nonprofits are not eligible unless they are a regulated entity under the Public Service Commission (PSC); currently only one nonprofit qualifies.

Option 2: Sponsorship Program

Sponsorship programs are a vehicle through which a state SRF program can enable more funding for NPS projects that do not have repayment sources. The tidal wetland jurisdictions do not currently have active sponsorship programs but there is potential for establishment of programs in certain jurisdictions.

The key next step for tidal wetland restoration advocates is to contact the state CWSRF program in your space and express interest in the state implementing a sponsorship program.

The table below provides information to guide outreach efforts to state CWSRF programs. Research to date indicates that Maryland and Delaware have opportunities to implement sponsorship programs through its CWSRF. In Maryland, the state's Conservation Finance Act (CFA) requires WIFA to "(8) To establish a sponsorship program that allows a local government to serve as the primary borrower and receive a loan for a publicly owned treatment works project at a reduced interest rate if the loan also includes financing for a sponsored nonpoint source project managed by an organization." While the state was already allowed to implement a sponsorship program, the CFA requires the program.

Delaware has an established sponsorship program, but it is on hold due to lower interest rates that make it challenging for the SRF program to forgo a portion of interest to allocate towards a NPS project. If rates charged by the program increase, it may be possible to reactivate sponsorship program funding.

Tidal Jurisdiction	Clean Water SRF Program	Notes on the Relative CWSRF Opportunity for Tidal Wetlands
DC	Clean Water Construction Grant Program (DOEE)	Loans: Unlike most states, D.C. and the U.S. territories receive their CWSRF funding as grants directly from the EPA, rather than establishing a revolving fund. The EPA provides funding for D.C.'s Clean Water Construction (CWC) program, which can cover up to 80% of a project's cost. Stormwater green infrastructure is an eligible project type. A tidal wetland project (the Kingman Lake Restoration project) is currently slated #2 on the program's PPL. The program did not publish a request for green or grey applications this year due to a large pipeline and funding uncertainty. Sponsorship: DC has not implemented a sponsorship program - it exists as a grant program with green infrastructure / wetlands as eligible project types.
MD	Water Quality Revolving Loan Fund (MDE)	Loans: MD funded one of the first NPS projects in the country. Sponsorship: The CFA requires the state to implement a sponsorship program; the state is currently hiring the next SRF program lead and seems motivated to develop a sponsorship program but has not had one previously.

VA	Virginia Clean Water Revolving Loan Fund (VA DEQ)	Loans: VA has a requirement that all PS loans are fulfilled before NPS loan applications are considered. Demand for PS loans currently exceeds supply, meaning that NPS projects are unlikely to receive loans. Sponsorship: VA has not implemented a sponsorship program.
DE	Delaware Water Pollution Control Revolving Fund (DE DNREC)	Loans: DE has funded tidal wetlands previously. The Delaware CWSRF loaned $2.9 million to the Delaware Department of Natural Resources and Environmental Control (DNREC) Division of Waste and Hazardous Substances to create two acres of wetlands by replacing 29,000 tons of soil contaminated with zinc with clean fill material and topsoil. The loan was repaid using Hazardous Substances Control Act tax revenues and an MOU giving DNREC the right to withhold HSCA tax revenues to pay annual CWSRF lease payments. Sponsorship: DE has had a sponsorship program in the past, but it is on hold due to lower interest rates (2%). Sponsorship programs work better with higher interest rates (3-4%).

Making SRF funds more accessible for tidal wetland restoration will require:

- Educating both the regulated community and tidal wetland restoration project developers about SRFs for project funding.
- Identifying mechanisms through which SRF loans for tidal wetland restoration projects can be repaid.
- Working with fund administrators at the state level to establish a sponsorship program.

Corporate Engagement & Partnership

As mentioned in the Innovative Finance Summary Report, corporate engagement can take many forms. Many corporations have sustainability objectives related to the resources they rely upon for their own operations, such as clean and plentiful water, and sustainably grown agricultural crops. Companies have set their targets in various ways, including through coalitions like Business for Social Responsibility and Ceres, and initiatives like The Climate Pledge and Science Based Targets Initiative (DuPont, headquartered in Delaware, is one of the Science Based Targets Initiative companies).

Several corporations, like Coca-Cola and technology companies with data centers, aim to replace the water they extract, using a volumetric water benefit calculation to pay for projects that replenish water supply. They typically work directly with nonprofit organizations such as Ducks Unlimited, the National Forest Foundation, and The Freshwater Trust, to identify projects in target watersheds to fund, based on a gallon-per-dollar calculation. While this approach doesn't translate directly to tidal wetland restoration, there may be other ways to calculate the benefits of tidal wetland restoration that make it desirable for corporate partners to invest in. Some corporate engagements are formalized into public-private partnerships (a mechanism that is covered in an earlier section of this paper).

Some steps for exploring corporate partnerships for tidal wetland restoration include:

1. Identify which corporations are headquartered in target geographies and who have made restoration or sustainability pledges.
2. Reach out to sustainable business networks that may be seeking project ideas to support via their own initiatives or through their member companies.
3. Clarify which industries rely on protecting and restoring tidal wetlands and gauge their potential interest in providing financial support.
4. As mentioned in the Pay for Success section, pursue identifying and quantifying measurable tidal wetlands outcomes that could be offered for purchase. We did review blue carbon and found that for several reasons it is not a viable option for the Chesapeake tidal wetlands, but there could be other quantifiable benefits still to be determined.

Recommendations and Insights

Across the Funding Inventory, Innovative Finance Summary, and this How-to Guide, we hope to offer ideas to projects seeking help with funding and implementation. But, we wanted to share additional insights and recommendations that we hope can contribute to deepening the array of resources to match projects to greater, and more varied, sources of funding.

1. First, the Funding Inventory we created for this project lists funding and financing sources that have been vetted for their appropriateness to fund and finance tidal wetland restoration in the tidal Bay jurisdictions. We hope that this will be a meaningful resource to anyone in the Chesapeake Bay seeking to fund tidal wetland restoration.
2. We recommend for consideration a dedicated regional "concierge" role or department to help jurisdictions and project developers find and evaluate various finance strategies based on their unique needs and resources. This idea is inspired by the State of Connecticut's Department of Energy & Environmental Protection Client Concierge program. While a Chesapeake Bay funding concierge wouldn't be exactly analogous to Connecticut's program, the idea of helping localities and projects get answers and quickly assess their needs is a common one.

3. New artificial intelligence tools are evolving to help grant applicants find and quickly apply for funding. For example, Stanford University students are developing a product called Airys to help prospective grantees find funding. It could be worthwhile to host an Airys briefing for Chesapeake Bay stakeholders to learn about this tool and potentially share meaningful feedback about how it could be applied in the region for a variety of Bay Program goal-related projects.

4. Bay Program Accelerator[61]: There could be benefit in launching a program that helps projects get through design and permitting, fundraising, and implementation for an array of the revised Bay program goals.

[61] "Accelerator" often refers to a program that provides mentorship and access to funders to help start-up businesses build their business plan, raise funds, and access a target market.

Examples of Effective Funding Leverage

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Overview

This document contains a collection of examples of projects that have successfully leveraged at least two sources of funding and/or financing for restoration. Some are very specific to tidal wetlands restoration and the Chesapeake Bay geography, but some are relevant simply for their modeling of leveraging funds for restoration generally.

We have provided in-depth information on four projects that we suggest are the most relevant as models. Please reach out to the authors with any questions, to discuss these examples in more detail, or to suggest additional projects be added to the list.

Poplar Island, Maryland

Project Description

Officially called the Paul S. Sarbanes Ecosystem Restoration Project at Poplar Island, the Poplar Island Restoration Project is demonstrating how beneficial use of dredge material from the Port of Baltimore can be used to rebuild and restore a barrier island. The restoration is a collaborative effort involving the U.S. Army Corps of Engineers (USACE) and the Maryland Department of Transportation Maryland Port Administration (MPA).

The island, which measured about 2,000 acres in the 1600s, and 1,100 acres in 1847, had dwindled to just 2-4 acres by the 1990s. Over the centuries, land subsidence, sea level rise, and erosion have battered the various barrier islands in the Chesapeake Bay. These changes in land area significantly reduced habitat necessary for migrating birds, reptiles, plants, fish, and other species. Along with the restoration project, many organizations and agencies are leading monitoring to quantify the benefits to species like terns and terrapins.

Poplar Island was selected as one of a few barrier islands to be restored using dredged material from the navigation channels at the Port of Baltimore. Dredged sediment is transported to the island to build up land area, which is then planted with new vegetation. The project has goals of 776 acres of tidal wetland and 829 upland acres restored, using 67 million cubic yards of dredge material. To date, 382 acres of tidal wetland have been created, and a total of about 47 million cubic yards of material has been placed.

Poplar Island is the model for large-scale restoration efforts involving beneficial use of dredged material from the Port of Baltimore. James and Barren Island will be restored using the same methods via the Mid-Bay Island project.

Financial Structure

Total project funding of about $1.4 billion (full details below) is being shared by the Army Corps (75%) and the Maryland Port Administration (25%). The Port Administration subcontracts day-to-day work to the Maryland Environmental Service (a nonprofit unit housed within the State of Maryland). Permitting is being handled by the Maryland Department of the Environment.

The Baltimore Harbor & Channels federal navigation project was initially authorized in 1958, which established a funding partnership between the US Army Corps and the Maryland Port Administration. Congress set the 75%-25% cost sharing arrangement specifically for the Poplar Island project in 1996. While these two funding sources have combined to support the project, many partners are carrying on pieces of the project work. For instance, the US Fish & Wildlife Service, NOAA, University of Maryland Center for Environmental Science, Salisbury University, and Smithsonian Environmental Research Center, have all participated in various wildlife and soil surveys and research.

The project began in 1994 and the first dredged material was placed on the island in the spring of 2001. Other key milestones include:

- 2007: project expansion approved by Congress to accommodate more dredge material and build upon successful habitat restoration
- 2016-2021: construction period for 575-acre expansion area
- 2017: Poplar Island is found to have "the most successful Common Tern colony" in the state.

In its 2025 annual Fact Sheet, the Baltimore District of the US Army Corps summarized spending and funding to date and through project completion:

USACE Cost Estimate to complete	1,043,894,000
MDOT-MPA Cost Estimate to complete	347,965,000
Total Estimated Cost	**$ 1,391,859,000**
USACE appropriations through FY 2025	$528,947,000
Estimated MDOT-MPA contributions through FY 2025 (cash and work-in-kind)	$176,316,000
Total anticipated spending through FY2025	**$705,263,000**

Scalable Opportunity for the Bay

- This project approach (beneficial dredge material reuse and federal/state funding partnership) is already featured in the Mid-Bay Island project, which includes restoration of Barren and James Islands.
- There is extensive potential for beneficial reuse of dredge material in the Chesapeake Bay; more creative approaches to cost-effective storing, moving and placement of materials are needed.

Helpful resources

Poplar Island Restoration | U.S. Fish & Wildlife Service (fws.gov)

Main Poplar Island Restoration website (www.poplarislandrestoration.com)

Poplar Island: A story of successful restoration | University of Maryland Center for Environmental Science (umces.edu)

Poplar Island – Maryland Port Administration (maryland-dmmp.com)

Pocomoke River Restoration

Project Description

The Pocomoke River flows into the Chesapeake Bay, running 73 miles, and draining water from Delaware, Maryland and Virginia, across four counties. After decades of being altered to address flooding on nearby agricultural fields, the river and its floodplain are being restored in what is considered Maryland's largest ecological restoration project.

The Nature Conservancy is leading the Pocomoke River Restoration Project, which is designed to restore 14 miles of floodplain reconnection to improve nutrient management and flood storage during heavy precipitation events. During the 1940s, efforts to protect low-lying agricultural fields from floodwaters led to large-scale efforts to construct channels and ditches to prevent flooding, which altered natural river geomorphology. For example, a 17-mile stretch of the river was dredged, and the resulting materials were used to harden the riverbanks (via spoil levees), significantly altering the riverbed and increasing the flow and speed of water—further disconnecting the river from its surrounding floodplain.

In addition to supporting better nutrient filtration, the river is an important source of habitat for dozens of migratory bird species and various aquatic species. The river also plays a critical role in regional tourism, which has important economic benefits. The project had restored over 3,000 acres of wetland by 2023.

Financial Structure

The Nature Conservancy led a process of bringing together several partners and sources of funding to support the Pocomoke River restoration project. They recognized early on that the project would be large and they set out to define project needs, and through that process, they were able to identify various funding sources. There was not a single master plan; the funding arrangements evolved over time. The project launched in 2014.

A key partner was the USDA Natural Resource Conservation Service, which was able to make funding available through their large landowner programs, specifically the Wetland Reserve Easement program. Another major funder was the Chesapeake and Atlantic Coastal Bays Trust Fund; their approximately $1,500,000 grant to The Nature Conservancy helped make funding available for landowner incentives in cases where landowners were not interested in partnering with a federal or state program. Additional funding was provided to The Nature Conservancy from Tom's of Maine, a company that has committed some of their philanthropic donations to river restoration; the France-Merrick Foundation, a Baltimore region funder; National Fish & Wildlife Foundation; and from a Natural Resource Conservation Service Conservation Innovation Grant, for supporting the project's science and monitoring needs. Overall, the initial Trust Fund grant leveraged as much as another $7 million, or even more. All this funding combined was able to support the key floodplain connection work, as well as restoration work across the Pocomoke.

Specifically, the Wetland Reserve Easement program was used to pay landowners for perpetual conservation easements, and The Nature Conservancy paid landowners $250/acre, or about one-tenth of the per-acre rate paid by NRCS[62]. Those landowners entered a 10-year agreement.

After initial project success, The Nature Conservancy also received a $1,000,000 grant from the National Fish and Wildlife Foundation, which, in addition to new wetland work in neighboring states and watersheds, allowed more work with landowners and agency coordination related to the Pocomoke River project.

Scalable Opportunity for the Bay

- This project demonstrates a process for undertaking the planning and funding for a large-scale restoration project. The Nature Conservancy acted as a sort of "hub" to bring together project partners, work with them to identify project needs, and solicit a mix of public and philanthropic funding.
- Funding from USDA's Natural Resource Conservation Service was paired with funding from Maryland's Chesapeake and Atlantic Coastal Bays Trust Fund to provide two different means of compensating farmers for their participation. This offered program flexibility and meant more landowners were likely to participate.

[62] NRCS rates shift each year; Mayland's 2025 rates are available here.

Helpful Resources

- Maryland DNR overview: Pocomoke River Restoration Project: Enhancing resiliency to climate variability and flooding
- "Freeing a Trapped River: Celebrating 10 years of restoration, partnership and the largest ecological restoration in Maryland's history." Pocomoke Floodplain | The Nature Conservancy in Maryland/DC
- The Chesapeake and Atlantic Coastal Bays Trust Fund Story Map [Select "Stream and Wetland Restoration" and then "Pocomoke Restoration"]
- Video: Freeing a Trapped River

Chesapeake Bay Environmental Center

Image: Plantings at the Living Shoreline Project at the CBEC
Source: MD DNR, May 5, 2025

Project description

The Chesapeake Bay Environmental Center (CBEC) is located in Grasonville, MD, close to Kent Island. The Center is an important space for environmental education and restoration and resilience projects - in 2004, CEBC was designated by Governor Ehrlich as a test site for innovative restoration techniques that could be scaled up elsewhere in the Bay. The CBEC has implemented living shorelines, beach nourishment, and thin-layer placement projects to protect the 500-acre property from sea level rise, storm surge, and other challenges.

A recent thin-layer placement project used dredged materials from 12 miles away to protect an existing marsh area at CBEC from sea level rise. A total of 8,200 cubic yards was thin-layer placed on three acres of marsh at CBEC. The total cost of the project was roughly $1.6 million for dredging and $500,000 for thin-layer placement, resulting in a total project cost of $2 million. Dredging is a frequent activity in the Bay, and provides a potential source of sandy material for restoration projects, but the timing, location, and quality of the dredged material must align with a restoration project in order for the sediment to be beneficially used. Beneficial use projects also benefit the communities conducting the dredging - finding a place to store dredged material can be challenging, with many on-shore storage sites filling up and restoration and other projects that need sediment and align with the dredging project difficult to identify.

This project demonstrates an effective beneficial use project because the timeline and geography of the dredge and restoration projects aligned, and the dredged material was of sufficient quality for the restoration site.

Financial Structure

The CBEC thin-layer placement project leveraged two sources of funding and finance: a tax district loan from Maryland's Waterway Improvement Fund was used to dredge a nearby channel and the sediment was then used for the restoration project at CBEC funded through Maryland DNR's Resiliency through Restoration Initiative.

Maryland's Waterway Improvement Fund is a special fund for recreational boaters and boating access. The Fund was established in 1966 and is funded through a one-time 5% excise tax on boat purchases and titles paid to the State. The Fund can make grants and loans to local governments for boating access facilities, dredging high-use channels and harbors, and purchasing equipment for fire and rescue. Applicants must show a benefit to recreational boaters and public access, and address depth needs (the program does not dredge deeper than 8 feet). The Waterway Improvement Fund has allocated over $400 million to nearly 5,000 projects since its establishment; individual dredging projects can range from $100,000 to up to $2 million. Large public access projects with high numbers of boaters may receive 100% of funding for the state while smaller projects may be a 50% cost-share between the state and local government.

The Fund also implements tax district loans, which was the structure used for the Price Creek dredging project. In this structure, Queen Anne's County in Maryland established a special taxing district for property owners in 2018. The County took out an $800,000 loan from the Waterway Improvement Fund for dredging of Price Creek, to be repaid over 25 years through an annual special tax assessment on property owners in the District.

Maryland DNR's Resiliency through Restoration Initiative funds design and construction of restoration projects that increase resilience by protecting communities from erosion, and other changing environmental condition-related impacts. Grant applicants must demonstrate community-wide benefits associated with the proposed project. The majority of projects funded through the program are living shorelines; the CBEC thin-layer placement project is a less common

type of wetland enhancement project for the Initiative. The Resiliency through Restoration Initiative funded 15% of the transportation costs and placement costs for the CBEC project.

Scalable Opportunity for the Bay

- Pairing dredging projects with restoration projects that are in close enough proximity to make the use of dredged material financially feasible is a structure that could be implemented in all of the tidal wetland jurisdictions where funding/finance is available for both dredging and restoration.
- The funding and financing sources for the CBEC are Maryland-specific and could be used in other locations along Maryland's coastal areas. Several sources are available to help identify where these project pairings might be made, including Maryland's BUILD tool. The BUILD tool spatially identifies the location of potential restoration projects and previous and upcoming dredge projects in order to help colocate potential beneficial use projects. An important caveat is that the Resiliency through Restoration Initiative is currently seeking sustainable funding to enable it to continue its grantmaking work in Maryland.
- Establishing a special tax district is something other local governments in the tidal jurisdictions of the Bay could consider; this is a way to aggregate and channel individual landowner funds to larger dredging projects.

Helpful Resources

Project Spotlight: DNR's Watershed and Climate Services Partners With Environmental Education Preserve To Build a Living Laboratory of Restoration Science (MD DNR, May 5, 2025)

Maryland Coastal Atlas: The Maryland Coastal Atlas combines spatial data layers of relevance to decision-making for coastal and marine areas.

BUILD Tool: The beta version of the BUILD tool is available and combines potential restoration project data with data on past and upcoming dredging projects. The tool seeks to assist decision-makers in identifying dredging and restoration projects that could be combined in beneficial use of dredged material projects. A User Guide and Storymap for the BUILD tool are available.

MD Department of the Environment Innovative Reuse and Beneficial Use Guidance Document

Berkeley Plantation

Project Description

The Berkeley Plantation property is located along the James River in Charles City County, Virginia. The James River is a tidal river of the Chesapeake Bay within the designated coastal zone of

Virginia's Coastal Resilience Master Plan. The expected sea level rise for the property is estimated at 3.5 feet by 2040 and 6 feet by 2080. A living shoreline project was constructed in 2024 on the property to protect the property's shoreline and productive land area and provide pollution reduction benefits to the Bay. The project's components - a 190-foot breakwater, a 540-foot sill with habitat gaps, and a 340-foot sill with habitat gaps, sand fill, and freshwater plants behind the structure to restore a freshwater wetland area - were designed to attenuate wave energy, stabilize slopes, design planting zones to accommodate wetland migration, and to elevate the wetland to persist. Overall, the project constructed a 1,500 linear foot living shoreline and restored 1.5 acres of wetland. Nearly 40,000 square feet of low marsh and 22,000 square feet of upland buffer were created. Design of the project cost $150,000; the total cost of the project including construction was $1.1 million. The project took three years to complete.

The project was implemented through a partnership between the James River Association, the Colonial Soil and Water Conservation District (SWCD), the Virginia Department of Conservation and Recreation - Shoreline Erosion Advisory Service, and the Virginia Department of Environmental Quality and benefited from collaboration with the Living Shoreline Collaborative (LSC). Private contractors were engaged for design and installation of the project.

The Berkeley Plantation project won the Clean Water State Revolving Fund's George F. Ames Performance and Innovation in the SRF Creating Environmental Success (PISCES) Award in 2025. This award "...recognizes CWSRF assistance recipients for exceptional projects and highlights them nationally" and evaluates projects for environmental and public health protection, community engagement, system partnerships, innovative financing, and problem solving (EPA CWSRF 2025).

Financial Structure

The Living Shoreline Collaborative (LSC), convened by the James River Association, is a group of state and regional entities focused on implementing living shoreline projects for coastal resilience within the tidal James River Watershed. The goals of the LSC are to develop and share knowledge about shoreline stabilization and water quality protection, increase capacity for living shoreline implementation, build relationships and conduct outreach, socialize and build acceptance for living shorelines, and increase collaboration and partnerships. Activities include planning, implementation and outreach, training, and monitoring (LSC Action Plan 2021-2023). The LSC was a fundamental partnership that supported development and implementation of the Berkeley Plantation Project.

Working together with partners including the Colonial SWCD, the Berkeley Plantation project was identified as a potential area to pilot use of the state agricultural cost-share program (Virginia Agricultural Cost-Share Program (VACS)) for a shoreline stabilization project aligned with VACS specifications for the SE-2 practice, Shoreline Stabilization.

The Berkeley Plantation Living Shoreline Project leveraged several sources of funding and finance throughout the project cycle. Grants were instrumental in establishing the LSC and paying for the

design of the Berkeley Plantation project. Landowner buy-in was also instrumental - the landowner had to agree to implement the project and take out a loan from the Clean Water State Revolving Fund (the Virginia Agriculture BMP Loan Program) for interim finance during the project construction period. After the project was completed it was verified and then reimbursed by VACS. Details of the different funding and financing sources are provided below.

- **2018 National Coastal Resilience Fund (NCRF) Grant:** In 2018, the James River Association received a $1 million NCRF grant, Building Adaptive Shorelines and Resilient Communities in the Lower James. This grant supported the creation of the LSC and associated activities from 2018-2021 (NFWF NCRF Grant Slate 2018).
- **2020 NFWF Innovative Nutrient and Sediment Reduction (INSR) Grant:** In 2020, the James River Association received a $1 million NFWF INSR grant, Water Quality Improvements in the James River through a Living Shoreline Collaborative, to further formalize the LSC and expand the Collaborative's planning, capacity-building, and outreach activities in the lower James River (NFWF INSR Grant Slate 2020). This grant supported activities of the LSC from 2021-2023. Importantly, this grant also supported the engineering design for the Berkeley Plantation Living Shorelines Project.
- Virginia Agriculture BMP (AgBMP) Loan Program: The AgBMP Loan program is part of Virginia's Clean Water Revolving Loan Fund under the Clean Water Act. The program provides low-cost loans to agricultural producers and SWCDs for implementation of agricultural BMPs. Eligibility is open to any agricultural producer or SWCD, but the program is intended to be used together with the existing VACS program, Virginia's Non-Point Source program and/or USDA's Natural Resources Conservation Service funding. The loan program provides 0% interest on all loans, principal forgiveness on some loans, and loan terms up to 10 years.
- Virginia Agricultural BMP Cost-Share Program (VACS): The Agricultural BMP cost-share program supports BMPs on agricultural land in the state by paying for a percentage (80% or 100%) of the producer's BMP costs up to a certain cap. The VACS cost-share funds were administered by the Colonial SWCD - Colonial SWCD reimbursed the land owner after the project was completed and verified. VACS requires a 15-year monitoring and maintenance plan from the landowner.

Scalable Opportunity for the Bay

To understand the potential to scale the financial structure implemented in the Berkeley Plantation project, it is first important to understand the policy conditions and drivers that exist in Virginia that enabled the Berkeley Plantation Project.

- The Virginia Coastal Resilience Master Plan identifies risks to coastal areas in the state and prioritizes areas for project implementation.
- Virginia's Phase III Watershed Implementation Plan (WIP) - In 2019, Virginia included 15 miles (roughly 80,000 linear feet) of shoreline management as a BMP practice goal for the James River Watershed to support the state in meeting Phase III WIP goals by 2025. WIPs

are roadmaps governing how Bay states will reach the Bay's TMDL regulatory requirement.

- Through Virginia Code § 28.2-1202, Virginia mandates that coastal landowners maintain their property up to the average low water line; the state has ownership of submerged areas beyond the average low water line.
- Virginia Tidal Wetlands Act Amendment - the Virginia General Assembly amended the Tidal Wetlands Act in 2020 (SB 776) to mandate that the Virginia Marine Resources Commission "...establish and implement a general permit regulation that authorizes and encourages the use of living shorelines as the preferred alternative for stabilizing tidal shorelines in the Commonwealth…the Commission shall permit only living shoreline approaches to shoreline management unless the best available science shows that such approaches are not suitable". This mandate prevents implementation of shoreline stabilization projects that might otherwise be acceptable (e.g., use of rip rap) under NRCS and VACS rules.
- Interim finance available through AgBMP Loan Program: Most landowners are not able to pay project costs up-front for living shoreline and tidal wetland restoration projects. These projects are expensive, with a typical outlay of $150,000 to $200,000 required for project design to determine construction and overall project costs. Existing cost-share programs are reimbursement-based, requiring that the landowner incur costs of design and build before the project can be approved and cost-share funding released.
- Virginia has a state-funded agricultural cost share program that runs parallel to NRCS funding and provides a repayment source for the SRF agricultural BMP loan program, which acts as interim finance.

The potential scalable opportunities for the Bay include:

- The Berkeley Plantation project was the first living shoreline project to receive interim finance from the AgBMP Loan Program and cost-share funding from VACS. This innovative project structure has paved a pathway for other living shoreline / tidal wetland restoration projects to implement a similar financial structure in Virginia. The Colonial SWCD has already received a NFWF grant to repeat this structure.
- Maryland has an existing state-funded agricultural cost-share program that could potentially be leveraged in a similar way, though this would require a loan program such as Maryland's Clean Water SRF to lend to agricultural projects. Robust alignment of project requirements across the loan and cost-share programs would be required.

Helpful Resources

- Berkeley Plantation Living Shoreline website.
- Wetlands Watch, Designing Living Shorelines for Sea Level Rise in Virginia: A Resource for Practitioners
- One-pagers for different target audiences on Designing Living Shorelines for Sea Level Rise in Virginia

- James River Association Berkeley Plantation Living Shoreline project website

Leverage Strategy Guidance

October 31, 2025

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Introduction: What is a leverage strategy?

Over the course of a few months in 2025, the consultants at Environmental Policy Innovation Center have been working to identify new and innovative financing and funding sources that can be used to pay for tidal wetland restoration projects in the Chesapeake Bay. However, these sources don't need to be used in isolation. In fact, very often, restoration projects are funded by multiple sources at once; sometimes, one source of funding might be used to repay another source. Therefore, we have gathered together a brief list of effective examples of projects that have leveraged multiple sources of funding. While project developers may not have set out with formal leverage strategies for these projects, they were ultimately successful in combining two or more sources to support project outcomes.

For instance, some barrier island restoration projects such as Poplar, James, and Barren Island, all pair funding from the US Army Corps of Engineers together with Maryland Port Administration funding. While not a tidal wetland example specifically, the Pocomoke Island River Restoration project demonstrates the combining of public and private funding. We also found an interesting example from one of British Columbia's Fraser Delta restoration projects - the Sturgeon Bank project combines philanthropic funding from insurance companies together with national and provincial (i.e., public) restoration funding. Another structure that solved the problem of project finance–when costs are incurred up front but grants only pay at the end–involved a combination of grant funding for project design, a Clean Water State Revolving Fund (SRF) loan for construction, and a state grant program for loan repayment. Finally, we looked at a structure that solved the problem of locating usable and cost-effective sediment by pairing a special tax district-backed loan with state funding for coastal resiliency projects.

Please refer to the resource, "Examples of Effective Funding Leverage," for more details on the projects described in this document.

Where to Begin

While it is not necessary to know at the outset how a project might leverage various funding sources, there are a few steps worth taking up front to prepare for the possibility.

First, a project developer should always assess the full range of a project's costs across the project cycle. It is helpful to know how much funding you need for any research and design, planning, implementation, monitoring, and any other project phases. With different funding sources best matched to various project cycles, you may be able to–or need to–attract funds from different sources for each phase. In fact, there is substantially more funding available for construction than there is for design. As you work through project cycle costs and consider funding sources, keep this imbalance in mind.

Next, identify the potential benefits and beneficiaries of your tidal wetland restoration project. The better you know who will benefit and how, the easier it will be to "sell" the project to a funder.

This is especially true for attempts to raise private finance. In a recent article[63], the authors point out a core challenge with attracting private financing for nature-based projects:

> *Projects typically start with worthy ecological goals, then attempt to retrofit market demand, rather than starting with understanding who might pay and why. To overcome this challenge, we need to reframe our thinking. Instead of asking, "How can we fund this important conservation project?" we should ask, "How might we create environmental solutions that deliver enough value for specific customers that they would pay for them?" This shift in mindset requires approaching conservation finance like a startup venture, not a traditional conservation project.*

Finally, building partnerships is a useful way to layer capacity and multiple funding sources into a project. Partners will each have their own relationships and experiences with funding, and they can bring their own connections and expertise to the project.

Take the time to understand, consider and evaluate potentially appropriate funding and financial solutions. This project has generated several resources to help you! There is an inventory, a how-to-guide, list of project examples, and this guidance document, which will guide you through the options. We have designed these materials to focus exclusively on tidal wetland restoration in the Chesapeake Bay so you will not need to sift through pages of information about other ecosystem types or geographies to find what you're looking for.

Potential Leverage Strategies To Explore

Leverage Models from the Chesapeake Bay

The examples listed in the resource, "Examples of Effective Funding Leverage," demonstrate different approaches to leveraging at least two funding sources per project. We have listed several of those approaches here, with examples.

Pairing federal and state funding. The Poplar Island Restoration project utilizes funding from the US Army Corps of Engineers paired with Maryland Port Administration funding. The project splits financial responsibility 75%/25% between the two entities, respectively. This model of pairing federal and state funding is not unusual. The same approach will be used for the Mid-Bay project of restoring James and Barren Islands, also through the partnership of the US Army Corps and the Maryland Port Administration. These projects also take advantage of the ongoing need for dredging in the Port of Baltimore's navigation channels, providing a consistent supply of nearby dredge material.

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[63] Ben Guillon and Genevieve Bennett. "Design for demand: What actually drives private finance for nature?" Forest Trends' Ecosystem Marketplace. 2025. Nature's investment frontier: Practical paths forward for biodiversity markets and finance. Washington DC: Forest Trends Association. https://www.ecosystemmarketplace.com/wp-content/uploads/2025/04/Natures-Investment-Frontier_Final-1.pdf

Philanthropic donations to make public dollars go farther. The Pocomoke River Restoration is an example of a project that was able to combine public and philanthropic dollars to fund a large-scale project that spanned two states, directly engaged landowners, and carried out science and monitoring tasks. The Nature Conservancy helped shepherd an effort to plan for the large-scale restoration, bring partners into early planning efforts, identify project funding needs–and their potential supporters–and ultimately handle donations from various sources. They worked with donors that had both national and local funding geographies. They also leveraged the well-established NRCS Wetland Reserve Easement landowner incentive program with additional funding that could fund a different flavor of landowner agreements for higher program participation.

In the course of our research, we also learned about a Ducks Unlimited Canada project, in part funded by philanthropic donations from an initiative that raised grants from insurance companies. The Nature Force initiative supports wetland restoration and green infrastructure projects for mitigation and adaptation from funds that were raised from over a dozen insurers. Nature Force donations have been an important part of the funding stack for Ducks Unlimited Canada, which is carrying out a British Columbia project reusing dredge material from the Fraser River to rebuild the estuary. The project will support salmon and migratory bird habitat. Philanthropic donations are often more flexible than public funding, allowing Ducks Unlimited to support project costs that are otherwise not covered by their substantial federal and provincial funding.

Leveraging special taxing districts to acquire loans, and then pairing them with restoration grant funding. In the Chesapeake Bay Environmental Center (CBEC) project, the costs of sediment for a thin-layer placement to enhance and protect a marsh area was provided free of cost from a nearby dredging project. The dredging project was conducted for boater access on a local waterway through a special tax district established by the county - the tax district was leveraged to take out a loan from a state waterway loan program, using annual tax assessments on property owners within the district to repay the loan. A grant from a state restoration program focused on coastal resilience was then used to pay for a small portion of the sediment transport costs and the costs of the restoration project itself (placement of the sediment on the marsh). This financial structure illustrates the benefits of aligning different goals and funding/finance sources in the Bay to enable tidal wetland restoration.

Leveraging loans as interim finance with public dollar repayment sources. The Berkeley Plantation project is an example of creative use of multiple sources of funding and finance to pay for different parts of the project cycle. The example also underscores the importance of effective, multi-stakeholder partnerships to get projects funded and implemented. In the Berkeley Plantation example, grant funding was used to support partnership development and project design. Project design in particular is difficult to locate funding for - it is often expensive (~$150,000) and may not result in a fundable project; grant funding that has a higher risk tolerance can therefore be essential for funding project design. While state and federal dollars are available for funding construction, reimbursement-based grants often leave landowners and/or project proponents with extremely expensive projects to carry until they are completed and

verified, and many landowners/project developers cannot do this. In this case, an agricultural program developed as part of Virginia's Clean Water State Revolving Fund (SRF) was aligned with the state's agricultural cost-share program to fill the finance gap over the course of the project. The landowner was able to take out a loan and pay for project expenses as they were incurred, and then to have the loan repaid by the state's agricultural cost-share program once the project was completed and verified to meet the program standards.

Additional Leverage Models

Through interviews and research we have also identified some useful ideas for leveraging funding that come from other geographies and/or project types, or that we are not sure have ever been tried.

Leveraging multiple grant sources for different project phases. Our research showed that some projects rely on one grant source for project design and permitting, and another source for project implementation and construction. For example, in Maryland, projects that receive Chesapeake Bay Trust Watershed Assistance Program funding for design can then apply to the Chesapeake and Atlantic Coastal Bays Trust Fund for implementation funding.

Leveraging dredge material as a match. We've heard of at least one project that was able to use dredged material they had acquired as a match for a grant.

Tax or fee for repaying SRF loan. While we did not come across specific tidal wetlands examples in our research, a tax or fee program (also covered in the "Summary of Innovative Funding & Financial Mechanisms for Tidal Wetland Restoration") could be a source of repayment for a loan from the State Revolving Funds program. While State Revolving Fund loans are commonly repaid from ratepayer fees, wetland projects could establish a new taxing or fee mechanism that would raise revenues for restoration and also be directed toward repaying a State Revolving Fund loan.