

Strategies for Financing Water Quality Restoration in Delaware



Prepared by the University of Maryland Environmental Finance Center for the Chesapeake Bay Program Office on behalf of the State of Delaware

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About the Environmental Finance Center

The Environmental Finance Center (EFC) at the University of Maryland is part of a network of university-based centers across the country that works to advance finance solutions to environmental challenges. Our focus is protecting natural resources by strengthening the capacity of local decision-makers to analyze environmental problems, develop effective methods of financing environmental efforts, and build consensus to catalyze action. Our goal is to equip communities with the knowledge and tools they need to create more sustainable environments, more resilient societies, and more robust economies.



7480 Preinkert Drive, Preinkert Hall | College Park, MD 20742 | efc.umd.edu

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Executive Summary

Background and purpose

Delaware has affirmed that “clean water is essential to [its] future, its economy, its environment, and the health of its citizens.”¹ Yet, state and local efforts to reduce water pollution have not kept pace with the need, and today more than 85% of Delaware’s waterways do not meet federal and state quality standards.² Further, the state has experienced more frequent and severe flood events over the last several decades,³ highlighting Delaware’s vulnerability to the damaging costs of extreme weather.

To address the state’s water quality and flooding challenges, in 2015 the Delaware General Assembly established the Clean Water and Flood Abatement Task Force. This bipartisan group – comprised of state agency staff as well as stakeholders from the state’s agricultural and environmental communities – was charged with investigating these issues and making recommendations for improvement. After a yearlong inquiry, the Task Force presented to the General Assembly a set of findings and recommendations. Its chief recommendation was to “significantly increase the annual investments in upgrading and maintaining Delaware’s water infrastructure, promoting water quality, alleviating flooding and providing flood control, and preventing or responding to stormwater damage.”⁴

Meanwhile, the US EPA Chesapeake Bay Program Office commissioned the University of Maryland Environmental Finance Center (EFC) to identify options for Delaware to sufficiently and efficiently finance water quality restoration practices, in order to achieve pollutant load reduction targets for the Chesapeake Bay and to clean up waters in the 70% of the state that does not drain to the Bay. To conduct this analysis, the EFC interviewed Delaware state agency staff and reviewed the Task Force findings as well as the state’s existing funding streams and financing mechanisms for water quality restoration. Through this analysis, the EFC identified opportunities for Delaware to both narrow its water quality funding gap as well as change the way in which it finances restoration so that investments are made as efficiently and effectively as possible.

Delaware has opportunities to both reduce its water quality funding gap and to change the way in which it finances restoration, so that investments are made as efficiently and effectively as possible.

¹ Delaware General Assembly. June 17, 2016. *Final Report of the Clean Water and Flood Abatement Task Force Established Under the Provisions of Senate Concurrent Resolution No. 30 of the 148th General Assembly*.

² State of Delaware. 2014. *Combined Watershed Assessment Report (305(b)) and Determination for the Clean Water Act 303(d) List of Waters Needing TMDLs*.

³ Delaware Department of Natural Resources. Undated. “Trends and Future projections for Flood Hazards in Delaware.” Available: <http://www.dnrec.delaware.gov/coastal/DNERR/Documents/Coastal%20Training%20Program/Module%202%20-%20Climate%20Trends%20and%20Projections.pdf>

⁴ Delaware General Assembly. June 17, 2016. *Final Report of the Clean Water and Flood Abatement Task Force Established Under the Provisions of Senate Concurrent Resolution No. 30 of the 148th General Assembly*.

It is the EFC's hope that the ideas presented in this report will inform the Delaware General Assembly as it considers the Task Force's recommendations and advances the state's goals of (1) increasing revenue flow for water quality restoration so that it is sufficient and stable, (2) harnessing all public, private and philanthropic resources to achieve clean water, and (3) maximizing the impact of state water quality and flood abatement investments so they achieve the greatest benefit for current and future Delawareans.⁵

Delaware's financing need and opportunity

While Delaware is working to achieve pollutant reduction targets for its impaired waterways – including those mandated in the US EPA Chesapeake Bay Total Maximum Daily Load – significantly more investment is needed in order to meet standards. The state's Clean Water and Flood Abatement Task Force succinctly summarized Delaware's water quality financing need: "More funding is needed, and a sustained, predictable source of funding that can be leveraged is a model that could have a tremendously positive impact on water quality in Delaware."⁶ The Task Force estimated Delaware's water quality and flood abatement funding gap to be approximately \$100 million per year.

This is an opportune time for Delaware to comprehensively reevaluate how it funds water quality restoration. The Clean Water Task Force's investigation was a high-profile process, presenting an opportunity to build momentum on their recommendations. Meanwhile, dozens of organizations statewide have coalesced as the Clean Water Alliance to advocate for dedicated water quality funding.⁷ Additionally, the state is in the process of updating its Watershed Implementation Plan for the Chesapeake Bay, a mandatory planning document that outlines how the state will achieve pollution reduction targets for the portion of Delaware that drains to the Chesapeake. This collaborative and comprehensive process between the state and affected stakeholders provides an opportunity to hone in on strategies (technical, programmatic, and financial) that will enable Delaware to meet its final 2025 pollutant load goals.

These ongoing and interrelated initiatives provide a golden moment for Delaware to reevaluate how it funds water quality restoration, take steps to adequately funding priorities, and pursue creative financing strategies that maximize the impact of state investments in water quality.

Report organization and menu of financing strategies

This report is organized into three parts. It begins with a brief overview of major drivers for water quality restoration in Delaware, including the state's progress toward achieving Chesapeake Bay Total Maximum

⁵ Goals articulated in the legislation establishing the Clean Water and Flood Abatement Task Force: Delaware Senate Concurrent Resolution 30, 148th General Assembly (2015-2016).

⁶ Delaware General Assembly. June 17, 2016. *Final Report of the Clean Water and Flood Abatement Task Force Established Under the Provisions of Senate Concurrent Resolution No. 30 of the 148th General Assembly.*

⁷ The Clean Water Alliance's statewide public education campaign is called "Clean Water Delaware."

Clean Water Alliance. "Clean Water Delaware" website. Accessed 4/6/17: <http://cleanwaterdelaware.org/the-clean-water-alliance>

Daily Load (TMDL) targets, based on data from the Chesapeake Bay Program partnership's Watershed Model and Delaware's interim reporting to US EPA.⁸ Next, the report overviews major state and federal funding streams for water restoration in Delaware and assesses the scale and nature of the state's water quality financing challenge.

The heart of the report is the final section, in which EFC presents a menu of strategies for financing water quality restoration in a way that is both sufficient and effective. These are not presented as recommendations but rather as a suite of options or strategies that Delaware may choose to implement as it seeks to improve the effectiveness and efficiency of its statewide water quality financing system. Strategies are organized into four broad categories:

Advance technical, programmatic, and regulatory options for reducing the state's funding and compliance gap. These include accelerating technological and programmatic improvements in BMPs, targeting existing restoration dollars to cost-effective practices and priority watersheds, and expanding regulations and/or incentives to capture a greater share of pollutant loads from unregulated sources within the state's nonpoint source sectors.

Develop stable, dedicated revenue streams for water quality restoration. Given the state's significant funding gap, this set of options is arguably the most important. There are no magic bullets for generating revenue; core options at the state level include implementing new tax and fee structures or expanding existing ones. Some gains may also be made by pursuing smaller dedicated funding source and by incentivizing localities to implement their own fee programs, especially for stormwater.

Maximize the efficiency of state water quality investments via changes to Delaware's financing system. Delaware has the opportunity to manage cash flow more efficiently and thereby reduce the overall cost of attaining water quality goals. These approaches could be pursued using existing water quality funds but would be more powerful with the inflow of sufficient revenue dedicated to achieving restoration targets. A key strategy here is to channel restoration dollars through a financing entity that is capable of making performance-driven funding decisions (ideally via a credit-based financing system), coordinating investments in order to maximize efficiencies, employing a full range of investment mechanisms, and leveraging state and federal dollars with corporate and philanthropic funds. Public-private partnerships and revenue bonds are additional strategies for stretching available revenue to achieve maximum impact.

Stimulate market-driven solutions to water restoration. Delaware could make substantial gains in both water quality outcomes and cost savings, by catalyzing market-based initiatives. The state's

⁸ Data cited in this report comes from the current version of the Watershed Model (Phase 5.3.2); an updated version, Phase 6, is under development. The Watershed Model draws on various sources to estimate pollutant loads for each major source sector. This report does not address any deficiencies with the current Model's data or assumptions.

roles might include synergizing water restoration and economic development efforts and investing in industries associated with clean water. Another strategy would be to jump-start restoration practices that also have the potential to be economically self-sustaining, such as shellfish aquaculture and manure-to-energy technologies. If such ventures could get off the ground at scale, consumers would share in the water quality financing responsibility simply by purchasing oysters or using electricity.

Whatever combination of strategies Delaware pursues as it seeks to restore the health of its waters, it will be critical for state leaders to emphasize that investment in water quality restoration is also an investment in residents' quality of life, in the state's security and adaptability in the face of climate risks, and in the long-term health and vitality of Delaware's economy.

Delaware's water quality financing challenge

Delaware implements a variety of pollution control strategies to address documented water quality impairment issues and has made particular progress in abating pollution from point sources. Nevertheless, more than 85% of the state's waterways fail to meet federal and state water quality standards, and Delaware has identified that significantly greater levels of investment are needed to implement conservation measures, especially in the agriculture and stormwater sectors. To assess the scale and nature of Delaware's financing challenge, this section reviews core drivers for restoration (including the Chesapeake Bay TMDL), describes key existing streams of state and federal water quality funding, and discusses cost estimates for achieving restoration targets.

Drivers for water quality restoration

Clean water and flood prevention are not only essential for Delawareans' safety and well-being, they also provide the foundation for the state's economic health. Delaware's water pollution and flooding challenges are now significant enough that they are considered to have "become real threats to Delaware's prosperity," according to Delaware's Clean Water and Flood Abatement Task Force.⁹ The Task Force identified key economic sectors that are particularly threatened: tourism, recreation, agriculture, ports, ecosystems, and water supply. Together, these industries constitute \$6 to \$7 billion in annual economic activity, support over 70,000 jobs with \$2 billion in wages, and account for over \$200 million in annual revenues to the State.¹⁰

"Clean water is essential to Delaware's future, its economy, its environment, and the health of its citizens. [...] After many years of underinvestment from state and federal levels, nutrients, other forms of water pollution, and flooding have become real threats to Delaware's prosperity."

Delaware Clean Water and Flood Abatement Task Force

Investment in water quality restoration will help to protect these critical industries. In addition, state water investments could "have a stimulating effect on the Delaware economy through the employment of community members involved in the design, construction, and monitoring of water quality projects," according to the Task Force.¹¹ Indeed, a study conducted by the EFC in 2013 showed that investments in stormwater management practices have an impact on local economies similar to the impact of construction and other industries.¹²

⁹ Delaware General Assembly. June 17, 2016. *Final Report of the Clean Water and Flood Abatement Task Force Established Under the Provisions of Senate Concurrent Resolution No. 30 of the 148th General Assembly.*

¹⁰ Ibid.

¹¹ Ibid.

¹² Environmental Finance Center, University of Maryland. 2013. *Stormwater Financing Economic Impact Assessment: Anne Arundel County, MD; Baltimore, MD; Lynchburg, VA.*

Ensuring Delaware’s economic prosperity may be the greatest driver for accelerating water restoration investment. Further impetus comes from federal law, particularly the Clean Water Act (CWA) of 1972, which requires that all streams, rivers, and lakes in the United States meet certain water quality standards. Based on monitoring required by the CWA, Delaware has found that the majority (85% to 95%, depending on the estimate) of its waterways do not meet one or more water quality standards and are considered too polluted for their designated uses including fishing, swimming, shellfish, aquatic life, or drinking.¹³ The Delaware Department of Natural Resources and Environmental Control (DNREC) has developed Total Maximum Daily Loads for each of these impaired waterways and has developed and is in the process of implementing pollution control strategies to meet these load targets.¹⁴

While the CWA applies to the entire state, Delaware has added obligation to restore water quality in the portion of the state that drains to the Chesapeake Bay, a critically important but severely-impaired estuary whose watershed spans six states plus the District of Columbia. While Delaware makes up only 1% of the Bay watershed, roughly a third of the state’s total land area drains to the Bay, including half of Sussex County.¹⁵ This basin is subject to the US EPA’s Chesapeake Bay Total Maximum Daily Load, a “pollution diet” for the Bay that specifies levels of nutrient and sediment pollution reductions each Bay jurisdiction must achieve by 2025 in order to restore the health of the Bay. Delaware has joined its fellow Bay jurisdictions – Maryland, Virginia, District of Columbia, Pennsylvania, West Virginia, and New York – in resolving to work cooperatively to achieve reduction targets necessary to clean up the Bay.¹⁶ As in the rest of the state, water quality in Delaware’s Chesapeake Basin is chiefly impaired due to nutrient pollution from nonpoint source pollution sectors, although legacy toxic pollution is also a challenge.

Delaware is making progress toward achieving its Chesapeake Bay TMDL targets. In its most recent two-year milestone evaluation, completed June 2016, US EPA reported that Delaware had achieved its statewide targets for phosphorus and sediment and that it is on track to meet statewide nitrogen targets for 2017, the year by which states are expected achieve 60% of final 2025 goals.¹⁷ This statewide success is due in part to the fact that the state has achieved better than expected reductions in its point source sector.¹⁸

Despite these overall gains, however, the state is off target for nitrogen reductions in all source sectors except for wastewater, and EPA found that the state is not on pace to achieve final 2025 targets in its stormwater sector for all three pollutants. EPA is maintaining enhanced oversight of Delaware’s

¹³ Delaware’s State Watershed Assessment Reports specify designated uses for state waters as well as which waters are impaired.

¹⁴ Delaware Interagency Chesapeake Workgroup. 2012. *Delaware’s Phase II Chesapeake Watershed Implementation Plan*.

¹⁵ Ibid.

¹⁶ In addition to being governed by the Bay TMDL, each of these jurisdictions voluntarily affirmed their commitment to Bay restoration by signing the Chesapeake Bay Agreement in 2014.

¹⁷ US Environmental Protection Agency. June 2016. *Evaluation of Delaware’s 2014-2015 and 2016-2017 Milestones*. Available: https://www.epa.gov/sites/production/files/2016-06/documents/de_2014-2015_-_2016-2017_milestone_eval_06-17-16.pdf

¹⁸ US Environmental Protection Agency. June 2016. *Factsheet: EPA Evaluation of Delaware’s 2014-2015 Milestone Progress and 2016-2017 Milestone Commitments to Reduce Nitrogen, Phosphorus and Sediment*. Available: https://www.epa.gov/sites/production/files/2016-06/documents/de_milestone_factsheet_final_0.pdf

agriculture and wastewater sectors due to the state's failure to achieve several expected milestones,¹⁹ and there is also concern about the septic sector, which is not on pace to meet 2025 TMDL target allocations.

To meet 2025 targets, Delaware's agriculture sector will need to decrease annual nitrogen loading by 0.78 million pounds (26% reduction in the coming decade over current levels), phosphorous by 3.7 thousand pounds (16% reduction), and sediment by 7.66 million pounds (17% reduction).²⁰ The state's stormwater sector will need to reduce nitrogen loading by 85 thousand pounds (20% reduction) and phosphorous by 1.5 thousand pounds (7% reduction).²¹ The estimated cost of these reductions is discussed later in this section.

Existing financing mechanisms

Delaware's primary water quality financing mechanisms are grants and loans, through which the state makes federal and/or state funds available to local governments, wastewater treatment facilities, individual landowners (including agricultural operators), and other entities who then implement conservation practices. The state's main water conservation and restoration funding and financing programs include the Clean Water and Drinking Water State Revolving Fund program, the Twenty-First Century Fund Resource Conservation and Development Program, US EPA nonpoint source grant programs, and agricultural conservation cost-share programs that deploy federal and state dollars. Each of these programs is briefly described below.

Clean Water State Revolving Fund (CWSRF) and Drinking Water State Revolving Fund (DWSRF).

Administered by the Delaware Department of Natural Resources and Environmental Control (DNREC) and the Delaware Department of Health and Social Services (DHSS) respectively, CWSRF and DWSRF are capitalized by grants from US EPA along with a mandatory 20% state match. Funds are distributed to municipalities and other entities in the form of low-interest loans and, to a lesser extent, grants. Approximately \$338 million in Clean Water SRF and \$172 million in Drinking Water SRF funds have been issued since these programs were initiated in 1996. Annual funding levels have ranged between \$7 million and \$86 million annually, with an annual average of \$34 million over the last 6 years.²²

¹⁹ Ibid.

²⁰ Based on 2015 progress run figures, the most recent available. US Environmental Protection Agency Chesapeake Bay Program. TMDL Tracker. Accessed 1/19/17: <https://stat.chesapeakebay.net/?q=node/130>. Loads simulated using 5.3.2 version of Watershed Model and wastewater discharge data reported by Bay jurisdictions. Progress data updated 4/19/2016.

²¹ Based on 2015 progress run figures, the most recent available. Sediment targets have already been attained. US Environmental Protection Agency Chesapeake Bay Program. TMDL Tracker. Accessed 1/19/17: <https://stat.chesapeakebay.net/?q=node/130>. Loads simulated using 5.3.2 version of Watershed Model and wastewater discharge data reported by Bay jurisdictions. Progress data updated 4/19/2016.

²² Delaware General Assembly. June 17, 2016. *Final Report of the Clean Water and Flood Abatement Task Force Established Under the Provisions of Senate Concurrent Resolution No. 30 of the 148th General Assembly*.

Additionally, DNREC manages an Agricultural Nonpoint Source Loan Program in conjunction with county conservation districts, with funds from the state Pollution Control Revolving Fund. This program provides low-interest financing for various entities – farmers, private landowners, municipalities, nonprofits, etc – to implement nonpoint source pollution reduction activities that are consistent with the state’s nonpoint source management plan.²³ This program has not experienced strong demand in recent years.²⁴

Twenty-First Century Fund – Resource Conservation & Development Program. Established by the Delaware Legislature in 1995, the Twenty-First Century Fund was initially capitalized by a \$35 million settlement in the Supreme Court Case *Delaware v. New York* (1993).²⁵ The General Assembly has appropriated some additional money to this Fund.²⁶ Multiple sub-funds and programs were created through the Twenty-First Century Fund, in order to address a wide range of state priorities, including farmland preservation, neighborhood revitalization, infrastructure planning, wastewater and drinking water management, educational technology, port development, and others.

One of these sub-funds – the Resource Conservation and Development account – was created in order to fund watershed and drainage issues throughout the state.²⁷ This program is administered by DNREC and has been focused on solving drainage problems but secondarily has supported projects related to watershed planning, channel restoration, stormwater facility maintenance, and other capital improvement needs. The program originally had a non-state match requirement designed to leverage federal, local, and philanthropic funds, but that requirement was removed and most projects have been matched by state dollars, primarily in the form of contributions from Delaware’s Community Transportation Fund. Unfortunately, the program has not been funded at consistent levels, and it currently has a deficit in excess of \$78 million – the estimated cost of 871 approved or active projects that exceeds available funds.²⁸

US EPA nonpoint source grants. Federal funds for nonpoint source pollution reduction are made available via US EPA through Section 319 of the Clean Water Act. DNREC administers the state’s Section 319 grant program, which competitively awards funds to local governments and other entities to implement nonpoint source pollution reduction projects.²⁹ Section 319 also supports the state’s Nutrient Management Relocation Program, which subsidizes the transport of animal

²³ Environmental Finance Center. 8/20/14. “Delaware Agricultural Financing Forum” conference presentation. Available: https://efc.umd.edu/assets/de_ag_financing_workshop_compiled_presentations-1.pdf

²⁴ Marcia Fox. Delaware Department of Natural Resources and Environmental Control. 6/28/17. Communication with EFC.

²⁵ Delaware Code Title 29. State Government §6102A. Twenty-First Century Fund Investments Act. Available: <http://codes.findlaw.com/de/title-29-state-government/de-code-sect-29-6102a.html>

²⁶ Brooks Cahall. Delaware Department of Recreation and Environmental Control. 6/29/17. Communication with EFC.

²⁷ Delaware Code Title 29. State Government §6102A. Twenty-First Century Fund Investments Act. Available: <http://codes.findlaw.com/de/title-29-state-government/de-code-sect-29-6102a.html>

²⁸ Brooks Cahall. Delaware Department of Recreation and Environmental Control. 6/29/17. Communication with EFC.

²⁹ Delaware Department of Natural Resources and Environmental Control. “Information and Applications for 319 Grants” webpage. Accessed 5/11/17: <http://www.dnrec.delaware.gov/swc/district/Pages/319Grants.aspx>

waste out of priority watersheds.³⁰ In fiscal year 2015, DNREC received a total of \$1,144,706 in Section 319 funds.³¹

Additional federal funding is available via Chesapeake Bay-specific grant funds, which flow through the US EPA Chesapeake Bay Program Office. These include the Chesapeake Bay Implementation Grant Program (CBIG) and the Chesapeake Regulatory and Accountability Grants Program (CBRAP). CBIG provides funds for BMPs that reduce nutrient and sediment pollution entering the Bay. CBRAP funds establish and/or maintain compliance and enforcement programs to support the reduction of nitrogen, phosphorus, and sediment pollution delivered to Chesapeake Bay to meet the water quality goals. In addition, the Chesapeake Bay Stewardship Fund, administered by the National Fish and Wildlife Foundation, deploys both federal and corporate funds for water restoration.³²

Agricultural conservation cost-share programs. The Delaware Department of Agriculture works with conservation districts in each county to administer Delaware’s agricultural cost-share programs, which deploy both federal and state funds to incentivize agricultural best management practices on private farmland. Federal funding for these programs come from the USDA’s Conservation Reserve Enhancement, Environmental Quality Incentive, Agricultural Management Assistance, and Wetland Reserve programs. State contributions to the conservation cost-share program averages around \$1.5 million annually, and the federal share in 2014 totaled \$5.6 million.³³ In addition, the Delaware Department of Agriculture administers an agricultural and forest land preservation program as well as the Nutrient Management Plan Cost-Share Assistance Program which helps farmers develop nutrient management plans.³⁴

Funding gap and financing challenge

Despite the investments of Delaware’s water quality programs, the costs of addressing the state’s water quality challenges far surpass available funds. The Clean Water Task Force found that “over time, total funding for water quality has not kept pace with funding needs and with increasingly rigorous standards for what is considered to be clean, unimpaired water,”³⁵ and the Delaware General Assembly concurred: “federal funding is insufficient to meet the State's demands, and existing State resources are inadequate to meet current and future needs.”³⁶

³⁰ Delaware Department of Natural Resources and Environmental Control. 2015. *Nonpoint Source Program 2015 Annual Report*. Available: http://www.dnrec.delaware.gov/swc/wa/Documents/NPS/2015%20DE%20NPS%20Annual%20Report_FINAL%20SUBMISSIONv2.pdf

³¹ Marcia Fox. Delaware Department of Natural Resources and Environmental Control. 6/26/17. Communication with EFC.

³² National Fish and Wildlife Foundation. “Chesapeake Bay Stewardship Fund.” Accessed 5/11/17: <http://www.nfwf.org/chesapeake/Pages/home.aspx>

³³ Environmental Finance Center, University of Maryland. 8/20/14. “Delaware Agricultural Financing Forum” conference presentation. Available: https://efc.umd.edu/assets/de_ag_financing_workshop_compiled_presentations-1.pdf

³⁴ Delaware Department of Agriculture. “Grants and Loans” webpage. Accessed 5/11/17: http://dda.delaware.gov/financial_assistance.shtml

³⁵ Delaware General Assembly. June 17, 2016. *Final Report of the Clean Water and Flood Abatement Task Force Established Under the Provisions of Senate Concurrent Resolution No. 30 of the 148th General Assembly*.

³⁶ Senate concurrent legislation 30

The Task Force estimates that as much as \$100 million per year in additional funds will be needed to implement water quality programs in Delaware. This figure was derived from Chesapeake Bay WIP funding estimates, past loan and grant requests made through the Water Infrastructure Advisory Council (a group that makes funding recommendations to the General Assembly), projected drinking water needs, and recent flooding costs.³⁷ This estimated funding need equates to about \$105 per capita per year.³⁸

Another way to estimate Delaware’s funding need is to look at the cost of preventing a pound of pollution from entering local waterways, multiplied by needed load reductions. Several recent studies have attempted to estimate these per-pound costs for nutrient pollution, and these reports show that costs vary considerably based on location, pollution source, and selected BMP.³⁹ Nevertheless, it is possible to average estimates to arrive at reasonable ballpark figures (see Table 1). Multiplying these average costs by Delaware’s required load reductions (in pounds) per the Chesapeake Bay TMDL produces a total cost estimate of \$290.5 million over the coming ten years (see Table 1), or \$29 million per year.⁴⁰ Importantly, this estimate only accounts for nutrient pollution (not sediment, toxic, or other forms of pollution) and it only covers the portion of the state that drains to the Chesapeake Bay. The actual cost to abate all forms of the pollution statewide will be significantly higher – likely closer to or exceeding Delaware’s \$100 million estimate.

Table 1. Estimated cost of abating nitrogen and phosphorous pollution in Delaware’s nonpoint source sectors, Chesapeake Bay watershed

| | Median cost (\$/lb) | Required load reduction (million lbs) | Total cost (\$ million) |
|----------------------------------|---------------------|---------------------------------------|-------------------------|
| <i>Agriculture sector</i> | | | |
| Nitrogen | 100 | .78 | 78 |
| Phosphorous | 1,000 | .037 | 37 |
| <i>Stormwater sector</i> | | | |
| Nitrogen | 300 | .085 | 25.5 |
| Phosphorous | 10,000 | .015 | 150 |
| TOTAL COST | | | 290.5 |

Given the significant uncertainties involved in predicting costs of water quality restoration and in accounting for all existing sources of nonpoint source funding, Delaware’s precise funding gap likely

³⁷ Marcia Fox. Delaware Department of Natural Resources and Environmental Control. 6/28/17. Communication with EFC.

³⁸ Based on Delaware’s population as of the 2010 Census.

³⁹ See: Chesapeake Bay Commission. May 2012. *Nutrient Credit Trading for the Chesapeake Bay: An Economic Study*. James Shortle et al. August 2013. *Final Report: Building Capacity to Analyze the Economic Impacts of Nutrient Trading and Other Policy Approaches for Reducing Agriculture’s Discharge into the Chesapeake Bay Watershed*

Environmental Finance Center, University of Maryland. February 2015. *Maryland’s Chesapeake Bay Restoration Financing Strategy Final Report*. Maryland Department of Environment. October 2014. *Current Progress and Future Projections in Implementing MD’s Blueprint for Restoration*

⁴⁰ The \$29 million per year figures assumes a pay-as-you-go financing scenario. If Delaware uses debt or leveraging opportunities, the annual cost would go down because payments would be deferred to future years.

differs from these estimates. Nevertheless, there is no question that the state is facing a significant shortfall. And, this need could be heightened in coming years in light of other imminent funding pressures. Specifically, the state has identified that much of its drinking water and wastewater infrastructure is nearing the end of its useful life.⁴¹ Repairing and replacing this critical infrastructure carries a hefty price tag – an estimate by the American Society of Civil Engineers puts it at \$368.8 million for drinking water and \$206 million for wastewater over the next 20 years.⁴² These needs will likely add further strain to water conservation and restoration budgets.

Beyond this basic need for greater levels of investment, there is also opportunity to change the ways in which Delaware finances water restoration: the revenue streams and financing mechanisms themselves. One significant shortcoming of Delaware’s existing financing system is that revenue levels are not consistent from year to year. According to Gerald Kauffman, director of the University of Delaware’s Water Resources Center, “Right now, we rely on mechanisms that go up and down based on appropriations at various government levels.”⁴³ Reliant on general fund appropriations, water restoration and flood prevention must compete with other pressing state priorities, which puts them at risk of being underfunded. In addition, local jurisdictions have been reluctant to share responsibility for funding water needs, increasing the pressure for limited grant funds.

As the Task Force pointed out – and as the Clean Water Alliance outreach campaign is advocating – Delaware needs a stable, consistent, dedicated source of funding for water quality and flood prevention. There are also opportunities for the state to take better advantage of financing mechanisms that would enable Delaware to become more market-like in how it funds water restoration. This could not only achieve cost-saving efficiencies, it could lay the groundwork for effective private sector engagement in restoration – offering an opportunity to use public funds to leverage private, corporate and philanthropic capital. Strategies for achieving these goals are outlined in the next section.

⁴¹ Delaware General Assembly. June 17, 2016. *Final Report of the Clean Water and Flood Abatement Task Force Established Under the Provisions of Senate Concurrent Resolution No. 30 of the 148th General Assembly*.

⁴² American Society of Civil Engineers. 2017 Infrastructure Report Card: Delaware. Available: <http://www.infrastructurereportcard.org/state-item/delaware/>

⁴³ Bittle, M. 10/13/15. “Delaware panel eyes new effort to impose water tax.” *Delaware State News*. Available: <http://delawarestatenews.net/government/delaware-panel-eyes-new-effort-to-impose-water-tax/>

Options for sufficiently and efficiently financing water quality restoration in Delaware

Delaware has at its disposal a suite of separate but mutually supportive strategies to more effectively finance water quality restoration and flood abatement in its waters. Preliminary approaches include maximizing the impact of existing investments through improved BMP performance and tracking, and tightening nonpoint source regulatory regimes to capture a greater share of pollutant loads from those sectors. These approaches could reduce the state's funding gap, but nevertheless it will be necessary for Delaware to generate additional revenue for restoration, ideally through a statewide tax or fee with proceeds dedicated to water quality priorities. Once sufficient revenue is in place, several innovative and promising cash flow approaches have strong potential to maximize the efficiency of restoration dollars, leveraging additional sources of capital and reducing the overall cost of restoration. Finally, the state may be able to ignite market-driven restoration, by catalyzing ventures with the potential to take advantage of consumer demand for restoration-supportive goods and services.

Advance technological, programmatic and regulatory improvements

This set of approaches could reduce Delaware's funding and compliance gap by stretching state funds to achieve greater impact or by shifting part of the state's financing responsibility to regulated entities who are in a position to find cost-saving efficiencies.

Improve BMP performance, administration and tracking

Technological improvements in restoration BMPs enable load reductions to be achieved at a lower cost, freeing up funds for additional project implementation. Delaware may accelerate these improvements directly, by supporting research, or indirectly, by adopting performance-based financing, a strategy discussed later in this report. Additional savings may be achieved if efficiencies can be found in how existing restoration programs are administered and implemented. Delaware has also identified a need to better account for BMPs installed without the use of cost-share dollars. Within the Chesapeake Bay portion of the state in particular, this would in effect reduce the cost of compliance with the Bay TMDL, if it shows that the state is closer to pollution reduction targets than presently thought.

Prioritize funds to high-yield BMPs and watersheds

Another key opportunity is to better target existing funds to cost-effective BMPs and priority watersheds where investments have been shown to achieve the greatest pollutant load reductions. By investigating and verifying which practices and which watersheds achieve the greatest impact, Delaware could prioritize existing restoration dollars in a way that achieves greater impact for the investment. A study in

Pennsylvania found that choosing cost-effective BMP portfolios – defined as “a set of practices assigned to locations that minimizes the costs satisfying nitrogen, phosphorus, and sediment load allocation targets in each Chesapeake Bay jurisdiction” – could reduce that state’s cost of compliance with the Bay TMDL by an impressive 36%.⁴⁴ Delaware already does this to a degree through its agricultural conservation program, which targets BMPs in priority watersheds that have approved watershed plans.⁴⁵ However, the Clean Water Task Force has identified a need for greater “scientific monitoring and measurement [...] to gauge accurately the impacts of the projects and the overall quality of water in Delaware.”⁴⁶ In addition to further measuring and prioritizing within the agriculture sector, there may be opportunities to extend this approach to other sectors. An even more effective approach moves from funding projects to funding *outcomes* – again, this strategy of performance-driven financing is discussed later in the report.

Capture a greater share of pollutant loads from unregulated sources

Within Delaware’s nonpoint source sectors (agriculture and stormwater), the great majority of pollutant loads come from unregulated sources (see Table 2). There may be opportunities to impose tighter restrictions within these sectors or to expand incentives for voluntary conservation, which would enable the state to capture a greater share of unregulated loads.

Table 2. Percentage of nonpoint source sector pollutant loads from unregulated sources, Chesapeake Bay watershed

| | Nitrogen | Phosphorous | Sediment |
|-------------|----------|-------------|----------|
| Agriculture | 93% | 85% | 100% |
| Stormwater | 97% | 93% | 88% |

Source: US Environmental Protection Agency Chesapeake Bay Program. TMDL Tracker. Accessed 1/19/17: <https://stat.chesapeakebay.net/?q=node/130>. Loads simulated using 5.3.2 version of Watershed Model and wastewater discharge data reported by Bay jurisdictions. Progress data updated 4/19/2016.

In Delaware’s agriculture sector, options for reducing unregulated pollutant loads might include lowering the threshold for which operations qualify as a Concentrated Animal Feeding Operation (CAFO) and are therefore subject to those stricter regulations, or making nutrient and sediment management BMPs mandatory. Agriculture contributes the majority of pollutant loads to local waterways – not surprising given the size of the sector: agricultural uses comprise a third of Delaware’s land area⁴⁷ and the sector generates \$8 billion annually in economic impact and employs 30,000 residents.⁴⁸ In 2015, agriculture

⁴⁴ J. Shortle, Environment & Natural Resources Institute, Penn State University. “The Costs to Agriculture of Saving the Chesapeake Bay” presentation. Accessed 9/12/16: http://files.dep.state.pa.us/Water/ChesapeakeBayOffice/CBMT_May2014_AgCostsChesapeakeBayTMDL.pdf

⁴⁵ Delaware Department of Natural Resources and Environmental Control. 2015. *Nonpoint Source Program 2015 Annual Report*. Available: http://www.dnrec.delaware.gov/swc/wa/Documents/NPS/2015%20DE%20NPS%20Annual%20Report_FINAL%20SUBMISSIONv2.pdf

⁴⁶ Delaware General Assembly. June 17, 2016. *Final Report of the Clean Water and Flood Abatement Task Force Established Under the Provisions of Senate Concurrent Resolution No. 30 of the 148th General Assembly*.

⁴⁷ USDA Economic Research Service, Washington, DC. “Major Land Uses of the United States.” Last updated 12/19/11. <http://www.ers.usda.gov/data-products/major-land-uses.aspx>

⁴⁸ Delaware General Assembly. June 17, 2016. *Final Report of the Clean Water and Flood Abatement Task Force Established Under the Provisions of Senate Concurrent Resolution No. 30 of the 148th General Assembly*.

was responsible for 76% of the state's total nitrogen load delivered to the Chesapeake Bay, 88% of its phosphorous load, and 58% of its sediment load⁴⁹ – and as Table 2 (above) shows, the majority of these loads come from agricultural sources that are not regulated (i.e. subject to CAFO permitting requirements).⁵⁰ Delaware's Nutrient Management Law requires all animal feeding operations (those with greater than eight animal units) and anyone that applies nutrients to ten acres or more of land to develop a nutrient management plan; however, BMPs in these plans are largely voluntary.⁵¹

In the stormwater sector, 20 Delaware communities are regulated by Municipal Separate Storm Sewer System (MS4) permits under the federal National Pollutant Discharge Elimination System,⁵² and land covered by an MS4 permit represents about a quarter of Delaware's total acreage.⁵³ As of 2015, stormwater runoff accounted for 11% of the state's total nitrogen load to the Chesapeake Bay, 7% of its phosphorous load, and 34% of its sediment pollutant load.⁵⁴ As with agriculture, the majority of these loads come from unregulated areas. Delaware could reduce stormwater pollutant loading by adding nutrient controls to stormwater regulations within sensitive areas, as Maryland has done through its Critical Area Law, which requires jurisdictions to reduce stormwater runoff from new development in the protected area to pre-development levels.⁵⁵ Or it could ratchet down regulated loads by adding nutrient and sediment load reductions to MS4 general permits, as Virginia has done.

Imposing tighter restrictions on emitters of agricultural and stormwater pollution shifts some of the restoration cost from the state to regulated entities, who may be in a better position to find cost efficiencies. Clear, consistently-enforced regulations are also a critical prerequisite for effective private sector engagement in water quality restoration, as companies need to know what to expect in order to minimize risk. However, it is important to note that expanded regulatory programs require additional staff time and costs to administer, and new regulations are rarely politically popular. It may be worthwhile to undertake additional study of Delaware's nonpoint source sector regulatory framework and enforcement protocols, especially in comparison to those in neighboring Bay states, to identify specific opportunities for improvement.⁵⁶ Such an assessment may already be planned for the Chesapeake Bay portion of the state as part of Delaware's Phase III WIP update process.

⁴⁹ US Environmental Protection Agency Chesapeake Bay Program. TMDL Tracker. Accessed 1/19/17: <https://stat.chesapeakebay.net/?q=node/130>. Loads simulated using 5.3.2 version of Watershed Model and wastewater discharge data reported by Bay jurisdictions. Progress data updated 4/19/2016.

⁵⁰ Delaware Department of Natural Resources and Environmental Control. *Regulations Governing the Control of Water Pollution, Title 7, Del. Admin. Code §7201, §9.5 Concentrated Animal Feeding Operation (CAFO)*. Available: http://dda.delaware.gov/nutrients/downloads/2011_CAFORegs_final.pdf

⁵¹ Delaware Code. Title 3 Agriculture. §1200 Nutrient Management.

⁵² Delaware Department of Natural Resources and Environmental Control. *MS4 Map Table*. Available: <http://www.dnrec.delaware.gov/wr/information/swdinfo/pages/ms4.aspx>

⁵³ US Environmental Protection Agency Region III. May 2014. Summary Final Report: Delaware Stormwater Program Review. Available: https://www.epa.gov/sites/production/files/2015-07/documents/de_sw_report_final_2014_05_22.pdf

⁵⁴ US Environmental Protection Agency Chesapeake Bay Program. TMDL Tracker. Accessed 1/19/17: <https://stat.chesapeakebay.net/?q=node/130>. Loads simulated using 5.3.2 version of Watershed Model and wastewater discharge data reported by Bay jurisdictions. Progress data updated 4/19/2016.

⁵⁵ Within designated intensively-developed areas. Maryland Critical Area Commission. "Stormwater Management and Improving Water Quality in the Critical Area" website. Accessed 5/22/17: <http://dnr2.maryland.gov/criticalarea/Pages/stormwater.aspx>

⁵⁶ A good example of such an assessment is EPA Region III's 2012 review of Delaware's state stormwater programs: https://www.epa.gov/sites/production/files/2015-07/documents/de_sw_report_final_2014_05_22.pdf

Another way to capture the unregulated nonpoint source load is to ramp up incentive programs for voluntary conservation. This might include expanding the state's cost-share assistance for nutrient management planning and implementation, as there are currently more applications for assistance within these programs than are funds available,⁵⁷ or by pursuing more innovative incentive options such as subsidized insurance and loans for conservation practices in high-priority watersheds.⁵⁸ Stormwater-specific incentive programs might include subsidized nutrient management planning for large landowners such as golf courses, assistance to local governments to develop and implement local stormwater management plans, and homeowner education programs. It is important to note that while all of these incentive options could improve the efficiency of Delaware's overall nonpoint source reduction effort, they entail additional costs at the state level for administration and implementation.

Create stable, dedicated revenue streams for water restoration

As Delaware's Clean Water Task Force clearly articulated, a sustainable, predictable revenue source for water quality restoration is critical if the state is to close its funding gap and clean up impaired waters. The Task Force recommends that "the Delaware General Assembly should significantly increase the annual investments in upgrading and maintaining Delaware's water infrastructure, promoting water quality, alleviating flooding and providing flood control, and preventing or responding to stormwater damage."⁵⁹ A sustainable, codified revenue source not only makes it possible to implement the practices and monitoring systems needed to improve water quality; it also opens the door to access lower-cost debt financing mechanisms, such as revenue bonds. Revenue-generating options at the state level include taxes, fees, and smaller dedicated funding sources such as conservation license plates, corporate sponsorship programs, and fine proceeds.

Implement new tax or fee mechanisms

States can finance major public needs via existing revenue sources (usually the general fund), which requires reallocating budget funds from other programs. But the only mechanisms for generating new revenue at scale are taxes and fees. Before the state can successfully pursue this approach, it will be important to accurately estimate the funds that will be needed to achieve state and federal water quality goals, including de-listing priority impaired waters and achieving Chesapeake Bay TMDL targets. Funding programs are more effective and accepted when they can demonstrate that they are achieving their intended purpose. For this reason, Delaware should consider conducting a thorough needs and cost

⁵⁷ Delaware General Assembly. June 17, 2016. *Final Report of the Clean Water and Flood Abatement Task Force Established Under the Provisions of Senate Concurrent Resolution No. 30 of the 148th General Assembly*.

⁵⁸ These ideas and others are discussed in further detail in EFC's September 2016 report *Financial Incentives for Water Quality Protection and Restoration on Agricultural Lands in Pennsylvania*.

⁵⁹ Delaware General Assembly. June 17, 2016. *Final Report of the Clean Water and Flood Abatement Task Force Established Under the Provisions of Senate Concurrent Resolution No. 30 of the 148th General Assembly*.

assessment. This will enable the state to design water quality funding programs that produce sufficient revenue and achieve impact.

One alternative in the tax and fee category is to impose a tax on nutrient and sediment emissions. Such pollution taxes have the benefit of directly dis-incentivizing the undesired activity (in this case, water pollution), and when set at the appropriate rate, they can achieve reductions in the most economically efficient way and also catalyze the development of innovative pollution reduction technologies. They are also more easily administered than many regulatory programs, and they provide a flexible revenue stream because the rate can be adjusted over time as needed.⁶⁰ Though pollution taxes are still relatively rare, there are a few case studies to draw lessons from, such as New York City's tax on "dirty" fuel oils which led to the discovery of cleaner fuel options⁶¹ and the 1990 federal tax on chlorofluorocarbons, which contributed to the global phase-out of this pollutant.⁶² Alternatively, taxes on other non-pollution related goods or activities can be dedicated to water restoration, as is the case with Maryland's Chesapeake and Atlantic Coastal Bays Trust Fund which is capitalized by state motor fuel and car rental taxes.⁶³

There are barriers associated with implementing a pollution tax, including the challenge of identifying an appropriate rate. In addition, pollution taxes are considered by some to be regressive, in that they can impose a disproportionate burden on lower-income consumers. But the most significant barrier is likely to be political opposition. Even though such a tax could be implemented in a revenue-neutral way (i.e. accompanied by a reduction in other taxes for affected parties), it is not likely to enjoy broad support.

Fees are a related option. While similar to taxes, fees differ in that they are assessed in order to recover some of the cost of providing a service to a beneficiary, rather than simply raising revenue or dis-incentivizing undesired activities. Fees generally need to be directly linked to the cost of providing the service and applied uniformly and fairly to all beneficiaries (though exemptions can be made in some circumstances), and funds raised through the fee should be applied exclusively to providing the service.

This is the strategy recommended by Delaware's Clean Water Task Force, but the idea of a dedicated fee for water quality was first proposed in 2014 by Governor Jack Markell. The Governor's proposed fee would have been assessed on a per-household and per-business basis, with revenue to be designated for water and wastewater projects, waterway restoration, flood-control work, and conservation programs. This proposal was taken up the following year by state representatives Michael Mulrooney and Bryan Townsend, who co-sponsored a bill for a Clean Water Fee. The proposal called for assessing fee rates on the value of structural improvements to residential and commercial properties, with average single family

⁶⁰ Experimental Economics Center. "Advantages of Green Taxes." Accessed 9/29/16: <http://www.econport.org/content/handbook/Environmental/pollution-control-revised/Advantages.html>

⁶¹ Charles Komanoff. 4/29/09. "Give Fees a Chance: Pollution Taxes Work." *The Grist*. Available: <http://grist.org/article/pollution-taxes-work/>

⁶² Ibid.

⁶³ Maryland Department of Natural Resources. 2016. *Maryland's Chesapeake and Atlantic Coastal Bays Trust Fund Fiscal Year 2016 Budget At a Glance*. Available: <http://dnr2.maryland.gov/ccs/Documents/TrustFundFY16.pdf>

households paying between \$45 and \$85 per year. Tax-exempt, agricultural, and stormwater fee-paying parcels were to have received fee reductions.⁶⁴ The fee was expected to raise \$30 million per year with proceeds to flow into to a state Trust Fund managed by a public board.

This measure failed to gain sufficient support, but the Clean Water Alliance – a broad coalition of environmental and other organizations statewide – continues to advocate for dedicated water quality funding.⁶⁵ If public support can be mobilized for a fee, this option has strong potential to provide the sustained, consistent, sufficient funding that Delaware needs to both achieve local water quality goals and comply with federal mandates.

Delaware’s proposed Clean Water Fee would provide sustained, reliable funding for water quality priorities in the state.

Should Delaware advance the option of a statewide fee for water restoration, several factors may contribute to success. First, as the state already knows, it will be critical to couple the proposal with a robust public education campaign. The Task Force has identified a broader need for public education about Delaware’s water quality impairment and the factors causing it; it may be effective to combine this effort into a coordinated, thoughtfully planned and adequately funded outreach initiative. The Clean Water Delaware campaign has laid good groundwork.

An effective education campaign will be able to shape the narrative around the proposed fee. This is important because, depending on how the fee is designed, it may in fact function more like a tax than a fee. To be a true fee, it would need to be linked to the cost of providing a service (restored water quality and/or abated flooding); assessed uniformly and fairly on beneficiaries of that service; applied strictly to providing that service; and able to be opted out of at least in part by users who take actions to mitigate their liability. An example of a statewide fee that ultimately functioned more like a tax is the Maryland’s Bay Restoration Fund. Assessed on residents served by wastewater treatment plants or on-site sewage disposal systems, the fee is used to upgrade treatment plants.⁶⁶ Despite the debate about whether the Fund is a “flush fee” or a “flush tax”, the more important point is that it has been incredibly effective at achieving its purpose – reducing nitrogen pollution to local waterways and the Bay. When building public support for a Clean Water Fee (or tax), it will be critical for Delaware leaders and other stakeholders to focus not on the mechanism’s name but on its potential to achieve state and local goals.

A second important consideration is where proceeds are held. To achieve desired impact, revenue should be placed in a fund where they can be most effectively deployed. The Clean Water Task Force recommended that revenue should be “pooled in a fund whose use – absent a supermajority vote of the General Assembly – is focused exclusively on water quality projects and on the scientific monitoring and

⁶⁴ Montgomery, J. 5/6/15. “Delaware bill would give \$30M yearly to clean water.” *The News Journal*. Available: <http://www.delawareonline.com/story/news/local/2015/05/06/delaware-clean-water/70909144/>

⁶⁵ Clean Water Alliance. “Clean Water Delaware” website. Accessed 4/6/17: <http://cleanwaterdelaware.org/the-clean-water-alliance>

⁶⁶ Maryland Department of the Environment. “Bay Restoration Fund” website. Accessed 5/23/17: <http://www.mde.state.md.us/programs/Water/BayRestorationFund/Pages/index.aspx>

measurement necessary to gauge accurately the impacts of the projects and the overall quality of water in Delaware.” This is similar to the Clean Water Fund option discussed below.

A final important consideration is administering the fee so that it is collected fairly and efficiently without unnecessary burden to fee-payers or the state. The Task Force considered various options for collecting the fee, including surcharges to water bills or septic and well permit fees. Ultimately the Task Force recommended that the Department of Finance collect the fee as a surcharge on personal income taxes and business license fees, a method deemed to be “most likely to lead to a successful collection of the Clean Water Fee, including administrative practicality and clarity, as well as equity more broadly.”⁶⁷

Beyond a statewide fee, it is worth mentioning another fee-based option for funding water quality: stormwater utility charges. While a local rather than a state source of funding, stormwater fees are increasing in popularity around the country as a mechanism for providing dedicated funding to manage stormwater needs. By shifting the responsibility for managing – and financing – stormwater to the local level, powerful financing efficiencies can be achieved. Delaware law authorizes localities to establish fee systems to fund stormwater management programs.⁶⁸ Wilmington has a stormwater utility in place and Newark has proposed launching one. The state could encourage other jurisdictions to follow suit, through outreach, training, and technical assistance – or it could even offer incentives such as priority review or bonus points on state grant applications or a reduction in required local match for funding programs for municipalities that have adopted a stormwater utility. Tightening stormwater regulations would also be a driver for municipalities to consider utility fees.

Investigate alternative dedicated funding sources

While taxes and fees are the most effective means to generate sufficient and consistent funding, there may be opportunities to supplement this core funding via other, smaller sources of revenue. An example is Maryland’s successful “Treasure the Chesapeake” license plate. Residents who voluntarily choose this special plate pay \$20 upfront and \$10 per year with their registration fees, \$5 more than a standard plate.⁶⁹ Proceeds go to the Chesapeake Bay Trust, a nonprofit organization that makes grants to improve water quality in the Chesapeake Bay watershed. Since it was founded in 1985, the Trust has deployed more than \$45 million in grants.⁷⁰ The organization also receives funding from donations through a checkbox on state tax return forms.

Delaware has three environmental conservation plates, each of which costs \$35 upfront in addition to regular registration fees. Proceeds go to the Delaware Center for Inland Bays, the Partnership for the

⁶⁷ Delaware General Assembly. June 17, 2016. *Final Report of the Clean Water and Flood Abatement Task Force Established Under the Provisions of Senate Concurrent Resolution No. 30 of the 148th General Assembly*.

⁶⁸ Delaware Code. Chapter 40, Title 7, §4005.

⁶⁹ Maryland Department of Transportation Motor Vehicle Administration. “MVA Fee Listing.” Accessed 5/23/17: <http://www.mva.maryland.gov/about-mva/fees/>

⁷⁰ Maryland Department of Transportation Motor Vehicle Administration. “Background Scene Plates.” Accessed 5/23/17: <http://www.mva.maryland.gov/vehicles/registration/where-their-money-goes.htm>

Delaware Estuary and the Marine Education, Research and Rehabilitation Institute. In 2014, a total of 1212 conservation plates were sold, generating \$42,420.⁷¹ This program could possibly be more successful if the three plates were combined into one for branding purposes (a “Clean Water” plate), and an opportunity for generating additional revenue is to charge a small annual fee in addition to the upfront purchase price. Depending on how the program is structured, proceeds may accrue to a state agency or to nonprofit organizations; either way they should be dedicated for water quality restoration priorities.

A Clean Water license plate raises funds from individuals. A model for leveraging *corporate* dollars is Virginia’s Streetscape Appearance Green Enhancement (SAGE) program, whereby municipalities garner corporate sponsorships to design, install and maintain stormwater retention facilities in public rights-of-way. Companies fund individual streetscape gardens in high-visibility locations, in exchange for recognition signage at the site. This program provides multiple benefits, including stormwater treatment, community beautification, and reduced cost to the public sector. The success of this model in several Virginia localities prompted the state to launch a statewide version, the Comprehensive Roadside Management Program managed by Virginia DOT.⁷²

Fine proceeds are another potential source of dedicated funding. An example is supplemental environmental project (SEP) fines, which are imposed on the responsible entity in a pollution incident and used for an eligible environmental project other than corrective action from the incident. In Virginia, the conservation grant-making organization the Virginia Environmental Endowment was created using a SEP.⁷³ Drawbacks of relying on fines include that they are one-time funds and that funding levels are erratic and unpredictable, the latter of which is also true for mechanisms like a conservation plate or corporate sponsorship programs.

None of these options will produce sufficient revenue to bridge Delaware’s water quality financing gap. However, they would raise funds that could be directly applied to implementing projects, and more importantly, pursuing a range of approaches like these could help advance a culture of finding innovative, effective solutions to water quality challenges – solutions that involve all members of the community including residents and businesses. Importantly, they also have potential value as marketing mechanisms, reinforcing name recognition and support for Delaware’s clean water efforts.

⁷¹ Nann Burke, Melissa. 8/30/14. “New look for ‘Dull-aware’ license plate?” *The News Journal*. Available: <http://www.delawareonline.com/story/news/traffic/2014/08/29/new-look-delaware-license-plate/14800449/>

⁷² Code of Virginia. §33.2-265

⁷³ Water Environment Federation. Undated. “The Stormwater Challenge” slide deck. Available: https://www.epa.gov/sites/production/files/2017-01/documents/session_5_french.pdf

Maximize the efficiency of water quality investments via changes to Delaware’s financing system

Securing sufficient and stable revenue is the most important step in attaining Delaware’s water quality goals. The second key opportunity relates to cash management. By changing how the state pools and invests restoration funds, Delaware can achieve efficiencies and reduce the overall cost of complying with mandates. This would not only reduce the state’s revenue gap; it could also make a revenue-generating campaign more successful by demonstrating to the public that funds are achieving maximum impact.

Authorize an independent financing entity to manage water restoration investments

To maximize the efficiency, consistency, and flexibility of state and federal water quality investments, Delaware could consider channeling all water quality restoration funding through an independent financing agency or authority. This entity would have authority and flexibility to:

- Pool capital from various sources including state, federal, private investors, and even philanthropic donors, so that public funding can more effectively be used in concert with these sources of capital;
- Spend these funds over time on the highest-yield projects, investing when effective projects are ready to be funded, not when public budgeting cycles dictate;
- Establish performance criteria for water quality investments and award funding based on these criteria (and adapt criteria as new information becomes available over time); and
- Facilitate water quality trades within a state or regional credit financing system.

This entity could administer existing water quality (and flood abatement) funds, and/or it could manage a new “Clean Water Fund” created through a Clean Water Fee or other revenue program. Pooling together Delaware’s disparate water quality revenue streams would allow the state to realize efficiencies that come with scale and to improve coordination and prioritization, which ultimately accelerates impact. Further, channeling these funds through an independent entity isolated from public budgeting cycles improves the flexibility of investments and stabilizes funds over time. It also creates a firewall between water quality investments and regulatory programs, enabling investments to be focused exclusively on water quality performance goals (a topic addressed next). All of this is critical for leveraging private capital, as the private sector values clear expectations and measurable outcomes.

Changing how Delaware pools and invests water quality funds could reduce the overall cost of restoration and achieve goals more quickly.

An example of an entity that functions this way is the Pennsylvania Infrastructure Investment Authority (PennVEST). Created in 1988, PennVEST is state authority charged with improving water quality by providing low-interest loans and grants for the design and construction of wastewater, drinking water,

and stormwater infrastructure projects.⁷⁴ PennVEST also manages the state’s nutrient trading program, serving as a clearinghouse for nitrogen and phosphorous credits. The agency invests an average of \$284 million in grants and loans annually,⁷⁵ with revenue coming from the Clean Water State Revolving Fund, the Drinking Water State Revolving Fund, state general obligation bonds, PennVEST revenue bonds, and loan repayments and interest earnings.⁷⁶ The agency has the capacities outlined above: the ability to pool, hold, and leverage revenue; to facilitate nutrient credit trading; to manage investments across a range of finance mechanisms from traditional debt financing to water quality trading; and to target investments toward nonpoint source pollution reduction projects likely to achieve strong results, not just ones that are ready for funding in a given funding cycle.

case study:
**Pennsylvania Infrastructure
Investment Authority**

Shift to a performance-based financing approach

A powerful option for reducing implementation costs and engaging the private sector is to adopt a comprehensive performance financing approach. This approach focuses on the desired outcome rather than the means to get there. Paying for results (e.g. pounds of nutrients or sediment reduced) instead of projects provides the incentive and the flexibility that project implementers need in order to find the most cost-effective and highest-performing practices. It also provides clear expectations and rules of engagement, one of the key enabling conditions for private sector engagement.

Delaware is not a stranger to the concept of targeted, outcomes-oriented financing. As mentioned above, the state’s agricultural conservation program targets BMPs in priority watersheds with approved watershed plans.⁷⁷ Further, Delaware’s Nonpoint Source Program has established a goal to ensure that “NPS activities are focused in stream reach drainages with the highest potential for contaminant delisting and/or re-establishing designated uses.”⁷⁸ Delaware’s Clean Water Task Force recommended that investment decisions should be data-driven and that consideration should be given to project efficiencies, such as cost-per-pound of reduced nutrient runoff. It also recommended establishing performance criteria related to environmental justice.

Examples like these lay the groundwork for Delaware to take a robust and systematic approach toward performance-driven financing. This could be pursued through an explicit policy adopted by a new statewide water restoration financing entity or for a new Clean Water Fund, or the approach could be integrated into existing water restoration funding programs and mechanisms. Either way, a performance

⁷⁴ Pennsylvania Association of Conservation Districts. April 2014. “PennVEST Nonpoint Source Program: Frequently Asked Questions.” Available: <http://pacd.org/webfresh/wp-content/uploads/2012/03/FAQsApril2014Rev1.pdf>

⁷⁵ Paul Marchetti, PennVEST. 6/15/17. Communication with EFC.

⁷⁶ Brion Johnson, PennVEST. 2012. “Financing Clean Water Projects for Pennsylvania” presentation. Available: <http://www.dvrpc.org/EnergyClimate/WSTP/pdf/Presentations/Pennvest.pdf>

⁷⁷ Delaware Department of Natural Resources and Environmental Control. 2015. *Nonpoint Source Program 2015 Annual Report*. Available: http://www.dnrec.delaware.gov/swc/wa/Documents/NPS/2015%20DE%20NPS%20Annual%20Report_FINAL%20SUBMISSIONv2.pdf

⁷⁸ Ibid.

approach would require reductions in pounds of pollutants delivered to local waterways, with payments to contractors being contingent on those outcomes. This is a shift away from funding a suite of priority BMPs or watersheds, toward funding a suite of outcomes that can be measured and documented over the life of the project or another acceptable timeframe. Project managers – those closest to the project – would be given the flexibility to find the best methods for achieving reductions. A challenge with this approach is the cost of monitoring, measuring, and verifying outcomes. However, building these costs into contracts not only accounts for them upfront; it creates an incentive to improve the efficiency of monitoring procedures.

A good example of a public revenue program that uses performance to guide investments is the Chesapeake and Atlantic Coastal Bays Trust Fund. Formed by the Maryland General Assembly in 2007, the Trust Fund is capitalized with revenue from Maryland motor fuel and car rental taxes.⁷⁹ From when it was initiated in 2009 until 2015, the Fund invested more than \$250 million in efforts to improve the health of the Chesapeake Bay, including projects advancing local and state Watershed Implementation Plans (WIPs).⁸⁰ The Fund’s explicit goal is to ensure the greatest environmental return on investment.⁸¹ To that end, the Fund is advised by a Scientific Advisory Panel, which annually recommends where funds should be targeted and which BMPs and monitoring protocols are likely to be most effective. Based on Panel recommendations as well as geographic mapping and modeling, the Fund annually targets investments to “specific watersheds, watershed areas, projects and practices that provide the most cost-effective water quality benefits to the Chesapeake and Coastal Bays via reductions in non-point source nutrient and sediment loadings.”⁸² To track whether projects are achieving anticipated goals, the Trust Fund works with the Maryland Biological Stream Survey (MBSS) to document baseline conditions and monitor and compare the effectiveness of various BMPs.⁸³

case study:
**Maryland’s Chesapeake
and Atlantic Coastal Bays
Trust Fund**

A specific performance-based financing mechanism that Delaware might consider is the pay-for-success contract. In this model, state or local government agencies contract with private sector investors who provide up-front funding to a service provider, which in the case of water restoration may be a private landowner, nutrient credit aggregator, watershed organization or other similar party. The service provider conducts whatever activities are necessary to produce the desired outcome (e.g. pounds of pollution abated). If this can be achieved at a cost below what the government agency has agreed to pay, the remainder is profit to the investor. The government agency then repays the investors, often with a bonus, if the program meets its goals. If the program fails, taxpayers pay nothing. The pay-for-success

⁷⁹ Maryland Department of Natural Resources. 2016. *Maryland’s Chesapeake and Atlantic Coastal Bays Trust Fund Fiscal Year 2016 Budget At a Glance*. Available: <http://dnr2.maryland.gov/ccs/Documents/TrustFundFY16.pdf>

⁸⁰ Ibid.

⁸¹ Maryland Department of Natural Resources. Chesapeake and Atlantic Coastal Bays Trust Fund website. Accessed 7/21/14: <http://dnr2.maryland.gov/ccs/Pages/funding/trust-fund.aspx>

⁸² Ibid.

⁸³ Trust Fund Monitoring site: <http://dnr2.maryland.gov/streams/Pages/trustfund.aspx>; MBSS Maryland Stream Health site: <http://www.streamhealth.maryland.gov/>

model offers significant benefits to the public sector, including improved performance (as better performance equals a greater return on investment), increased innovation, and reduced costs. The model also transfers risk from the public to the private sector, which is usually better equipped to efficiently mitigate that risk.⁸⁴

Establish a credit-based water quality trading and financing system

The potential of markets to achieve environmental goals more quickly, effectively, and at lower cost than traditional regulatory approaches is well documented.⁸⁵ Water quality trading (WQT) in particular is a market mechanism that has received much recent attention, especially in the Bay watershed. Unlike standard agriculture and stormwater pollution controls which require emissions to be addressed on site, WQT allows regulated entities to meet permit requirements by purchasing reductions elsewhere, which theoretically maximizes efficiency.

Credit-based financing systems explicitly tie water quality restoration investments with the desired outcome of reduced nutrient and sediment loading to local waters, and are therefore an expansion of the performance financing concept. If Delaware were to structure water quality restoration transactions in terms of credits, the marketplace would have a consistent protocol for evaluating each proposed restoration project (i.e. in terms of how many credits it generates), and Delawareans would have a clear metric by which restoration progress can be measured. This would support enhanced transparency in how the state government finances restoration activity, and it would require project implementers in the private sector to be more transparent in accounting for performance, which would ultimately improve the efficiency ratio and result in greater conservation per dollar spent. When this system is designed correctly, it incorporates all the costs associated with a water quality BMP, including not only its design and construction but also its lifetime operations and maintenance, which over time can exceed the costs of construction.

Demand for credits may come from a variety of buyers, such as local governments seeking to comply with MS4 permits (especially if Delaware were to ramp up nutrient load limits); wastewater treatment plants needing to achieve regulated pollution reduction requirements; or state or federal governments investing subsidy money in restoration activities. Similarly, credits could be generated by a range of sources: agricultural operators planting cover crops; private firms aggregating water restoration BMPs on private land; municipalities or states constructing green infrastructure on vacant properties. Before being eligible to sell credits in a statewide or regional market, MS4 regulated communities would first need to meet their own local permit requirements.

⁸⁴ The Pay for Success Learning Hub, maintained by the Nonprofit Finance Fund, is a repository for information on this model and includes an assessment tool for governments to evaluate readiness to implement such a program.

⁸⁵ Shortle, James. April 2013. "Economics and Environmental Markets: Lessons from Water-Quality Trading." *Agricultural and Resource Economics Review* 42/1.

Pennsylvania, Virginia, and the District of Columbia already have well-established water quality trading programs in place, and Maryland has initiated a nutrient credit trading program. Delaware may wish to commission a feasibility study to investigate the potential of establishing a program modeled after these. To the degree that Delaware's program could be designed to integrate with existing programs, there is opportunity to reduce the basin-wide cost of Chesapeake Bay TMDL compliance and accelerate implementation of overall Bay restoration goals.

case study:

Clean Water Partnership
Public-Private Partnership,
Prince George's County and
Corvias Solutions

Advance public-private partnerships

Regardless of whether Delaware pursues the previous options, it may be able to harness the power of the private sector by forging public-private partnerships at state and local levels. The potential use of public-private partnerships (P3s) for stormwater management in particular has attracted a great deal of attention throughout the Bay region. A P3 is a contractual arrangement between a public agency and a private sector entity, through which the parties collaboratively deliver a good or service and share in bearing the potential risks and rewards.⁸⁶ P3s can be used for an entire project or for selected aspects, such as financing, design, construction, operations and maintenance, and monitoring and evaluation.

P3s are relatively new in the nonpoint source realm, though they have been used extensively in other sectors including wastewater, transportation, and military housing. Benefits of these arrangements include lower costs, expedited projects, improved asset management, and development of innovative strategies and technologies. P3s can also be designed to achieve specific economic development goals, such as a P3 in Prince George's County, Maryland, which requires that a certain percentage of project activities be conducted by small, local, and minority-owned businesses (see case study, below).

Despite their benefits, P3s are not a pot of gold. State and local governments will still need to identify reliable revenue streams (e.g. taxes, fees, grants, tolls, revolving loan funds, etc). When these dedicated revenue streams are available, however, a P3 may be able to better manage and leverage them. These arrangements are also particularly valuable in cases when it is important to reduce public sector risk or to avoid adding public sector capacity.⁸⁷

A hallmark example of a stormwater P3 in the Mid-Atlantic region is the Clean Water Partnership, a 30-year agreement between Prince George's County, Maryland and Corvias Solutions, a private stormwater management firm. Finalized in spring 2015, this agreement aims to install green infrastructure and low-impact development practices on up to 4,000 acres of impervious surface throughout the County, in

⁸⁶ The National Council for Public-Private Partnerships. "7 Keys to Success." Accessed 7/20/14: <http://www.ncppp.org/ppp-basics/7-keys/>

⁸⁷ An excellent resource for government agencies considering P3s is US EPA Region III's 2015 *Community Based Public-Private Partnerships (CBP3s) and Alternative Market-Based Tools for Integrated Green Stormwater Infrastructure: A Guide for Local Governments*. Available:

order to ensure compliance with federal MS4 permit requirements. Corvias will manage the design, construction, and long-term maintenance of stormwater infrastructure; the County expects that this integrated approach will “maximize the efficiencies and savings for the entire life cycle of the green infrastructure assets,”⁸⁸ as well as transfer risks associated with construction and maintenance from the public sector to the private sector.

The Clean Water Partnership is unique in its scale – it is attempting to manage urban stormwater and meet federally mandated requirements *county-wide*. As mentioned above, the program is also unique in its workforce and economic development goals; at least 30% of project activities are to be completed by local, minority-owned small businesses, with a workforce training element folded into the program. This partnership is still in its infancy, and Mid-Atlantic communities should watch closely to evaluate its progress and determine whether it is a model for the rest of the region.

Stimulate market-driven solutions to water restoration

Delaware understands that clean water is the foundation for a healthy economy and that water quality investments can stimulate significant economic activity. Yet there may be opportunity to better integrate the restoration effort with broader statewide economic development initiatives, to invest in key markets and industries associated with the restoration effort, and to stimulate consumer-driven restoration practices that shift some of the restoration burden to individuals without regulatory drivers. These strategies could efficiently advance Delaware’s water quality restoration goals while simultaneously moving forward other state priorities, including job creation and economic growth.

Develop industries and products that support clean water and target investments in BMPs that also support the local economy

A number of sectors with high growth potential – including sustainable agriculture and fisheries, urban green infrastructure, eco-tourism, and nature-based recreation – are predicated on clean water. As a coastal and agricultural state, Delaware is poised to take advantage of these “clean water” industries, and growth in these sectors could attract new businesses and skilled workers, improve quality of life for citizens, and enhance the state’s infrastructure foundation for long-term economic growth and development.

A study conducted by the EFC in 2013 showed that investments in stormwater management practices have an impact on local economies similar to the impact of other industries such as construction.⁸⁹ There is compelling evidence that effective water quality investments will pay real dividends to state and local

⁸⁸ Prince George’s County Clean Water Partnership website. “Frequently Asked Questions.” Accessed 7/20/14: <http://thecleanwaterpartnership.com/faqs/>

⁸⁹ University of Maryland Environmental Finance Center. 2013. *Stormwater Financing Economic Impact Assessment: Anne Arundel County, MD; Baltimore, MD; Lynchburg, VA.*

governments, and projects could be selected with an eye toward accelerating that economic impact. Similarly, local and state governments can seek synergies between water restoration and other community priorities in order to improve efficiency and multiply community benefits. For example, water quality and climate resilience needs may be addressed simultaneously when a wastewater treatment plant is rehabilitated to reduce nutrient loading and buttress against flood risks due to sea level rise.

Investigate incentives to grow market-based restoration initiatives

Several emerging, innovative ventures have the potential to function as restoration practices in and of themselves, while simultaneously producing goods and services that have value in the marketplace. Examples include shellfish farming, fruit and nut orchards integrated into riparian buffers, and waste-to-energy technologies. All of these have capacity to create jobs, improve water quality, and produce marketable products, namely oysters, shellfish, fruit, nuts, and energy. Delaware may benefit from fostering such innovative enterprises through startup incubators, business development assistance programs, entrepreneurial training, accelerator programs, seed funding grants, and similar efforts. State Revolving Funds may be a particularly good source of funds, as SRF must invest gains into interest-bearing projects. To the extent that consumers purchase goods and services that support water restoration, the state's responsibility for financing implementation is reduced – a novel win-win scenario.

Conclusion

Delaware has taken the critical first step in affirming that clean water and flood resilience are essential to its long-term health, well-being and economic stability – and that adequately funding these initiatives serves the state's best interest. Delaware's Clean Water and Flood Abatement Task Force has laid a solid foundation on which the state can now do the hard work of building concrete funding and implementation strategies, as well as public support to move forward. Revenue generation will necessarily be in the mix, but the state has an exciting opportunity to pursue a range of additional, innovative financing ideas in order to ensure that public funds go as far as possible in cleaning up Delaware's waters for the benefit of its current and future residents.