

Strategies for Financing Chesapeake Bay Restoration in New York State



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Executive Summary

Background and purpose

New York plays a critical role in preserving the health of the Chesapeake Bay. Its Southern Tier region contains the headwaters of the Susquehanna River, the Bay's largest tributary and the source of nearly half its total freshwater input. The state has affirmed a commitment to protecting and restoring the health of both its local streams and rivers as well as the Chesapeake Bay. In 2014, New York joined the five other states in the watershed and the District of Columbia in signing the historic Chesapeake Bay Watershed Agreement, which expressed the jurisdictions' intent to implement practices necessary to meet Bay water quality standards. New York is in the process of developing its Phase III Chesapeake Bay Watershed Improvement Plan, which will identify strategies and practices that New York plans to implement within each pollutant source sector in order to meet pollutant load targets by 2025.

This report is intended to support the development of this Phase III WIP, by offering financing options for New York to consider as it plans for successful WIP funding and implementation. Commissioned by the US EPA Chesapeake Bay Program Office (CBPO), the report was prepared by the Environmental Finance Center at the University of Maryland (UMD-EFC) and the Syracuse University Environmental Finance Center (SU-EFC). The EFCs' charge was three-fold: (1) review New York's progress toward achieving Chesapeake Bay TMDL goals as well as the estimated cost of achieving 2025 targets (2) investigate key components of the state's revenue streams and financing mechanisms for water quality improvements in the Bay, and assess the existing system's capacity to achieve restoration targets, and (3) present options for New York to finance Bay water quality protection and restoration in a manner that is sufficient and efficient.

New York's Chesapeake Bay financing need and opportunity

According to New York's most recent two-year milestone evaluation (completed in 2018), the state met its overall phosphorous target for the previous year but did not meet its statewide nitrogen and sediment targets.¹ Based on target loads from the state's Phase II WIP and recent progress data, it appears that New York will need to decrease statewide annual nitrogen loads by approximately 1.65 million pounds, phosphorous loads by 77,440 pounds, and annual sediment loads by 73.5 million pounds.² These represent decreases of 15%, 10%, and 23% over 2016 modeled loads, respectively. In the case of nitrogen and sediment, reductions required over the coming six years will be greater than those that have been realized over the previous decade, suggesting that the pace of reductions will need to increase. While these numbers may change in the Phase III WIP, reflecting revised planning targets as well as continued improvement in accounting for practices in the updated Chesapeake Bay suite of modeling tools, it appears that it will also be necessary for New York to increase investment in pollution reduction practices.

Funding to implement practices within New York's Chesapeake Bay watershed may be increased by directing a greater share of existing state funding sources to this region, as Bay restoration projects currently compete with many other needs and initiatives statewide. In addition, there may be opportunities to amend state financing mechanisms in order to maximize their efficiency and impact.

¹ US Environmental Protection Agency. July 27, 2018. *Evaluation of New York's 2016-2017 and 2018-2019 Milestones*. Available: <https://www.epa.gov/sites/production/files/2018-07/documents/final-evaluation-ny-2016-2017-and-2018-2019-milestones.pdf>.

² As of the 2016 Chesapeake Bay Watershed Model progress run. Source: US Environmental Protection Agency Chesapeake Bay Program. TMDL Tracker. <https://tmdl.chesapeakebay.net/>. Loads simulated using 5.3.2 version of Watershed Model and wastewater discharge data reported by Bay jurisdictions. Progress data updated 6/15/2017.

This could include implementing approaches to make state financing more performance-driven and marketlike, which could not only stretch funds further but could also lay the groundwork for attracting greater levels of private sector engagement in water quality improvement.

Report organization and potential financing strategies

The report is organized into three parts. It begins, in Section I, with a brief overview of New York's role in Chesapeake Bay restoration and its progress toward meeting Chesapeake Bay TMDL pollution reduction targets, based on data from the Chesapeake Bay Program partnership's suite of modeling tools and New York's interim reporting to US EPA.³ Section II assesses the scale and nature of the financing challenge that New York faces in meeting TMDL targets. The heart of the report is Section III, which presents a series of options for financing water quality protection and restoration in a way that is both sufficient and effective. These strategies are organized into the following four categories:

- 1. Augment funding streams for Chesapeake Bay WIP implementation.** This set of strategies includes ideas for directing a greater share of existing state water quality funds to New York's Southern Tier region, and it outlines options for implementing new revenue generation mechanisms.
 - Dedicate a portion of the Environmental Protection Fund to the Chesapeake Bay watershed, and ensure the Fund's long-term stability
 - Secure additional funding from the AEM Base Program and/or WQIP
 - Use Clean Water State Revolving Funds to support nontraditional water quality protection efforts in the Southern Tier, including nonpoint source and green infrastructure projects
 - Access less traditional funding sources for Bay restoration
 - Evaluate the need for new revenue sources such as taxes and fees
- 2. Leverage private sector capital and capacity to support Bay restoration.** These approaches aim to enhance the efficiency of state investments and to use these investments as a catalyst for private sector and market-based engagement in water quality improvement.
 - Enable and pursue strategic public-private partnerships
 - Adopt a comprehensive performance-oriented financing approach in state funding programs
 - Investigate the potential to participate in Chesapeake Bay water quality trading
 - Direct economic development investments to industries that support water quality restoration
 - Authorize an independent financing entity to deploy Bay restoration funds
- 3. Capture a greater share of unregulated pollutant loads.** These strategies include regulatory and incentive-based options for reducing pollution from nonregulated sources in the state's agriculture and stormwater sectors.
 - Expand regulatory regimes in the stormwater and agriculture sectors
 - Further incentivize voluntary conservation practices on unregulated lands (e.g. grants, cost-share programs, tax incentives, lending tools, insurance products)
- 4. Review state and federal funding programs for opportunities to maximize the effectiveness and efficiency of investments.** This set of options addresses the potential for programmatic advances, technological improvements, and augmented BMP tracking and reporting methods to reduce the cost of TMDL compliance in New York.

³ Progress data cited in this report comes from the 5.3.2 version of the Watershed Model; a new suite of models (version 6.0) were used to develop Phase III Planning Targets.

I. New York’s Chesapeake Bay restoration goals and funding needs

Water quality goals and progress

New York plays a critical role in preserving the health of the Chesapeake Bay. It contains the headwaters of the Susquehanna River, the Bay’s largest tributary and the source of nearly half its total freshwater input. Home to about 640,000 people, New York’s Chesapeake Bay watershed covers 6,250 square miles and spans 19 counties.⁴ New York makes up about 10% of the total Bay watershed and contributes roughly 5% of nitrogen, 5% of phosphorous, and 4% of sediment entering the Bay.⁵

To restore the health of the Chesapeake Bay and to preserve water quality in New York’s local streams and rivers, the state has joined the five other Bay states and the District of Columbia in adopting rigorous pollution reduction targets. These goals are spelled out in the US EPA’s Chesapeake Bay 2010 TMDL, which specifies levels of nutrient and sediment pollution reductions that must be achieved in each Bay jurisdiction by 2025 in order to meet water quality standards for dissolved oxygen, water clarity, underwater Bay grasses, and chlorophyll a.⁶ Table 1 shows TMDL final targets for New York and for the watershed as a whole.



Figure 1. New York’s location within the Chesapeake Bay watershed. Photo credit: US EPA Chesapeake Bay Program.

Table 1. Nutrient and Sediment Target Loads, 2025 (million lbs/yr)

	Nitrogen	Phosphorous	Sediment
New York	11.53	0.58	322
Chesapeake Bay watershed	201.41	14.17	7,340

Sources: Targets for nitrogen and phosphorous are from: US Environmental Protection Agency Chesapeake Bay Program. July 2018. “Phase III WIP Planning Targets.” Available: https://www.chesapeakebay.net/channel_files/27557/phase_iii_wip_planning_targets_updated_7.23.18.pdf. Target for sediment is from New York Department of Environmental Conservation. January 7, 2013. *Final Phase II Watershed Implementation Plan for New York Susquehanna and Chemung River Basins and Chesapeake Bay Total Maximum Daily Load*.

As part of the TMDL, each Bay jurisdiction was required to develop a Watershed Implementation Plan (WIP) that outlines a roadmap for achieving pollutant reductions in partnership with local and federal governments. The WIP process involves three phases: in the first phase, states allocated pollutant loads among sectors and described the steps that will be taken over time to meet 2025 goals. Phase II WIPs provided more detail on the initial strategies and identified how local governments will participate.

⁴ New York Department of Environmental Conservation. January 7, 2013. *Final Phase II Watershed Implementation Plan for New York Susquehanna and Chemung River Basins and Chesapeake Bay Total Maximum Daily Load*. Available: http://www.dec.ny.gov/docs/water_pdf/finalphaseiiwip.pdf

⁵ As of the 2016 Chesapeake Bay Watershed Model progress run. Source: US Environmental Protection Agency Chesapeake Bay Program. TMDL Tracker. <https://tmdl.chesapeakebay.net/>. Loads simulated using 5.3.2 version of Watershed Model and wastewater discharge data reported by Bay jurisdictions. Progress data updated 6/15/2017.

⁶ US Environmental Protection Agency. December 2010. *Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorous and Sediment*.

The third and final phase WIPs will specify how final reductions will be met. New York is in the process of developing its Phase III WIP, which will be submitted to EPA in summer 2019. As with previous phases, this new plan will be developed by the New York Department of Environmental Conservation in collaboration with the Upper Susquehanna Coalition and the New York Department of Agriculture and Markets, with input from relevant stakeholders. Informed by new target load allocations released by US EPA in summer 2018, the plan will identify strategies and practices that New York intends to implement within each pollutant source sector in order to meet final 2025 goals.

Scale and cost of New York’s remaining pollutant load reductions

While New York’s Phase III WIP will provide greater insight into the state’s progress toward meeting pollutant load targets, a relatively current snapshot can be obtained via the Chesapeake Bay suite of modeling tools (previously called the Chesapeake Bay Watershed Model).⁷ Managed by the Chesapeake Bay Program Partnership with input from Bay jurisdictions and other stakeholders, the suite of modeling tools enables states to regularly monitor progress toward load targets. It also guides the development of two-year milestone reports, in which states assess WIP implementation and outline short-term planning commitments.

According to New York’s most recent two-year milestone evaluation (completed in 2018), the state met its overall phosphorous target for 2017 but did not meet its statewide nitrogen and sediment targets.⁸ Based on target loads from the state’s Phase II WIP and recent progress data, it appears that New York will need to decrease statewide annual nitrogen loads by approximately 1.65 million pounds (a 15% reduction over 2016 levels), phosphorous loads by 77,440 pounds (10% reduction), and annual sediment loads by 73.5 million pounds (23% reduction).⁹ In the case of nitrogen and sediment, reductions required over the coming six years will be greater than those that have been realized over the previous decade, suggesting that the pace of reductions will need to increase.

Greater levels of investment in restoration practices will likely be needed in order for New York to achieve 2025 Chesapeake Bay TMDL pollutant load targets.

The scale of required load reductions varies by pollution source sector (see Tables 2 and 3, below). New York’s Phase III WIP will specify new sector allocations, but using goals from the Phase II WIP and recent Watershed Model progress data, it appears that the greatest reductions in nitrogen pollution will be needed within the agriculture sector (30.71%), followed by septic (10.5%). Agriculture also has the greatest gains to make in phosphorous reductions (nearly 15% over 2016 levels), followed by wastewater (11%). For sediment, the agriculture and forest sectors are already meeting 2025 goals, but sizable percentage gains are needed for stormwater and wastewater.

Table 2. Needed Nutrient Load Reductions in New York’s Major Pollutant Source Sectors, 2016 – 2025

	Nitrogen			Phosphorous		
	2016 load (million lbs/yr)	2025 target (million lbs/yr)	Needed reduction (%)	2016 load (million lbs/yr)	2025 target (million lbs/yr)	Needed reduction (%)
Agriculture	4.39	3.04	30.71	0.42	0.36	14.78

⁷ Progress data cited in this report comes from the 5.3.2 version of the Watershed Model; a new version (Phase 6) has recently been developed and was used to establish new planning targets. For more information, see: https://www.chesapeakebay.net/documents/Phase_6_Modeling_Tools_1-page_factsheet_12-18-17.pdf.

⁸ US Environmental Protection Agency. July 27, 2018. *Evaluation of New York’s 2016-2017 and 2018-2019 Milestones*. Available: <https://www.epa.gov/sites/production/files/2018-07/documents/final-evaluation-ny-2016-2017-and-2018-2019-milestones.pdf>.

⁹ Based on Phase II target loads (New York Department of Environmental Conservation. January 7, 2013. *Final Phase II Watershed Implementation Plan for New York Susquehanna and Chemung River Basins and Chesapeake Bay Total Maximum Daily Load*) and 2016 progress data (US Environmental Protection Agency Chesapeake Bay Program. TMDL Tracker. Progress data updated 6/15/2017).

Stormwater	1.26	1.14	9.85	0.11	0.10	7.38
Wastewater	1.71	1.61	5.67	0.10	0.09	11.35
Septic	0.36	0.32	10.52	n/a	n/a	n/a
Forest	3.12	3.16	(1.13)	0.11	0.12	(8.83)

Notes: Sector-specific 2025 values are Phase II WIP planning targets (source: New York Department of Environmental Conservation, January 7, 2013. *Final Phase II Watershed Implementation Plan for New York Susquehanna and Chemung River Basins and Chesapeake Bay Total Maximum Daily Load*.) 2016 values are delivered loads, as modeled by USEPA Chesapeake Bay Watershed Model Version 5.3.2 (source: US Environmental Protection Agency Chesapeake Bay Program. TMDL Tracker. Progress data updated 6/15/2017).

Table 3. Needed Sediment Load Reductions in New York’s Major Pollutant Source Sectors, 2016 – 2025

	Sediment		
	2016 load (million lbs/yr)	2025 target (million lbs/yr)	Needed reduction (%)
Agriculture	127.81	133.02	(4.08)
Stormwater	96.59	10.09	89.5
Wastewater	3.23	.97	69.9
Septic	n/a	n/a	n/a
Forest	97.81	107.84	(10.26)

Source: See Table 2.

Past progress provides perspective on these required reductions. Table 4 shows changes in pollutant loads in three of New York’s major pollutant source sectors between 2009 and 2016, compared to reductions that must be made by 2025, using Phase II planning targets.¹⁰ These figures suggest that the pace of load reductions will need to increase if New York is to meet targets on time. Some of the greatest gains will need to be made in the agriculture sector (for nitrogen), the stormwater sector (for sediment), and the wastewater sector (for phosphorous and sediment).

Table 4. Past and Future Pollutant Load Reductions in New York’s Major Pollutant Source Sectors, per Phase II Planning Targets (2009–2016 Actual and 2017–2025 Needed)

	Nitrogen		Phosphorous		Sediment	
	Past Load Reduction (Increase)	Needed Reduction (Increase)	Past Load Reduction (Increase)	Needed Reduction (Increase)	Past Load Reduction (Increase)	Needed Reduction (Increase)
Agriculture	3.27%	30.71%	19.81%	14.78%	3.48%	(4.08%)
Stormwater	(1.87%)	9.85%	11.78%	7.38%	3.25%	89.56%
Wastewater	(1.64%)	5.67%	0.57%	11.35%	0.26%	69.98%
Statewide	(1.95%)	15.06%	21.61%	10.33%	1.93%	22.59%

Notes: 2025 values are Phase II WIP planning targets (source: New York Department of Environmental Conservation, January 7, 2013. *Final Phase II Watershed Implementation Plan for New York Susquehanna and Chemung River Basins and Chesapeake Bay Total Maximum Daily Load*.) 2009 and 2016 values are delivered loads, as modeled by USEPA Chesapeake Bay Watershed Model Version 5.3.2 (source: US Environmental Protection Agency Chesapeake Bay Program. TMDL Tracker. Progress data updated 6/15/2017).

As mentioned, these sector load targets will change in the Phase III WIP. In Phase II, New York chose to apportion a relatively greater share of load reductions to the agriculture sector for several reasons,¹¹ but it may be possible for the state to shift some of the agricultural load to other sectors if necessary to

¹⁰ While this analysis uses Phase II sector planning targets, which will change in the Phase III WIP based on new statewide target loads released by EPA in summer 2018, the general conclusion will likely remain that the pace of pollutant load reductions needs to increase in order for the New York to achieve 2025 targets on time.

¹¹ Namely: this sector contributes the greatest share of controllable pollutant loads to the Bay from New York; agriculture reductions are generally more cost effective than stormwater or wastewater reductions; and funding for agricultural practices was considered to be more readily available.

achieve overall statewide targets. Regardless of how loads are apportioned in the updated WIP, however, it is clear that **accelerated reductions will be needed statewide in order for New York to meet its 2025 targets**. Many factors will affect New York’s ability to achieve these goals, not the least of which is the availability of sufficient funding to implement pollution reduction practices.

An accurate projection of implementation costs will become more feasible as the Phase III WIP is developed, as costs will depend on how New York apportions new target loads among sectors and on which suites of practices are chosen to meet reductions. However, it is possible to develop a reasonable cost estimate using previous (Phase II) sector-specific planning targets. A particularly helpful tool for calculating costs is the Chesapeake Assessment Scenario Tool (CAST). This web-based platform enables users in the Bay watershed to estimate the pollutant load reductions and costs associated with various BMP scenarios. Designed to replicate the results of the Chesapeake Bay Program’s suite of modeling tools, CAST is intended to help watershed planners find the most cost-effective suite of BMPs for achieving desired load reductions.

Table 5, below, presents a CAST scenario that assumes implementation of all BMPs proposed in the New Year’s Phase II WIP for major source sectors,¹² with a base year of 2018. CAST estimates annualized costs, or the cost to establish, operate and maintain the BMP amortized over the lifespan of the practice. Costs represent a single year of cost rather than the cost over the entire lifespan of the practice. This scenario suggests that a total of \$173 million per year could be required to implement planned BMPs, or a total of \$1.04 billion in the six years between 2019 and 2025.

Table 5. Cost to implement BMPs in New York’s Phase II Watershed Implementation Plan, per Chesapeake Assessment Scenario Tool

Sector	Annualized costs (\$)
Agriculture	108,410,006
Developed	57,866,585
Septic	6,725,839
TOTAL	173,002,430

Source: Chesapeake Assessment Scenario Tool. Scenario created 2/13/19.

Note: WIP II BMP inputs were translated from Phase 5.3.2 model version on 2025 current zoning base conditions with atmospheric deposition levels assuming current regulations are implemented.

Another way to estimate costs is to multiply needed pollutant reductions (pounds delivered per year) by the cost of preventing a pound of pollution from entering the receiving waterbody. Several recent Bay-wide studies have attempted to estimate these costs for agricultural and stormwater pollution, and the analyses show that costs can range significantly, depending on which BMPs are used and where the practices are located within the watershed.¹³

Geographic-specific BMP costs for the Bay watershed have also been estimated and catalogued by the Chesapeake Bay Program. This data is available at the county and state scale, and it includes both the total annualized cost to implement each BMP (for about 275 BMPs in total) as well as the cost per pound of pollution treated by each practice. To derive an aggregate cost estimate, EFC accessed BMP cost data

¹² CAST scenarios do not include wastewater sector costs.

¹³ See, e.g. Chesapeake Bay Commission. May 2012. *Nutrient Credit Trading for the Chesapeake Bay: An Economic Study*. and 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*.

for the 19 counties in New York that have land in the Bay watershed,¹⁴ and then derived the median cost-per-pound of all BMPs in each major source sector (for about 80 BMPs in total).¹⁵ Median costs were multiplied by required load reductions in each sector per current watershed modeling.

The results – presented in Table 6 – suggest that **a total of \$420 million per year could be required to achieve Phase II nutrient and sediment load reductions in New York’s agriculture, stormwater, and septic sectors** (the sectors that utilize BMPs in the Bay Program’s catalog). This is only a ballpark estimate, as it is based on average sector costs rather than costs for the actual BMPs that New York plans to implement. This more detailed level of planning will likely be part of New York’s Phase III WIP development process.

Table 6. Estimated Cost of Nutrient Load Reductions in New York’s Major Source Sectors, 2016 – 2025

	Nitrogen			Phosphorous			Sediment		
	Load reduction* (lbs/yr)	BMP median cost (\$/lb/yr)	Total cost (\$/yr)	Load reduction* (lbs/yr)	BMP median cost (\$/lb/yr)	Total cost (\$/yr)	Load reduction* (lbs/yr)	BMP median cost (\$/lb/yr)	Total cost (\$/yr)
Agriculture	1,347,659	30	40,429,771	62,446	420	26,227,396	(5,212,716)	0.50	n/a
Stormwater	124,556	640	79,716,050	7,966	7,539	60,056,801	86,499,323	2.11	182,513,572
Septic	37,636	831	31,275,335	n/a	n/a	n/a	n/a	n/a	n/a
Total			151,421,157			86,284,197			182,513,572

* 2016 modeled loads minus Phase II WIP 2025 planning targets. 2025 values are Phase II WIP planning targets (source: New York Department of Environmental Conservation. January 7, 2013. *Final Phase II Watershed Implementation Plan for New York Susquehanna and Chemung River Basins and Chesapeake Bay Total Maximum Daily Load.*) 2016 values are delivered loads, as modeled by USEPA Chesapeake Bay Watershed Model Version 5.3.2 (source: US Environmental Protection Agency Chesapeake Bay Program. TMDL Tracker. Progress data updated 6/15/2017). Source for BMP costs: US EPA Chesapeake Bay Program. *Chesapeake Assessment Scenario Tool: BMP Pounds Reduced and Costs by County.* Available: <http://cast.chesapeakebay.net/Documentation/DevelopPlans>. Data notes: Costs are estimated in 2010 dollars and represent a single year of cost rather than the cost over the entire lifespan of the practice. Costs are annualized average costs per unit of BMP (e.g.: \$/acre treated/year). Capital and opportunity costs are amortized over the BMP lifespan and added to annual operations and maintenance (O&M) costs for a total annualized cost. Costs are those incurred by both public and private entities.

A helpful point of comparison for these figures is a cost projection for the agriculture sector developed by New York as part of its Phase II WIP. The total cost to install and maintain proposed agricultural BMPs (between 2012 and 2024) was estimated to be about \$250 million. This is significantly lower than the above estimates for the agriculture sector over roughly the same timeframe: \$933 million (Bay Program BMP cost-per-pound data, 2016-2025) and \$650 million (CAST scenario assuming implementation of agricultural BMPs in New York’s Phase II WIP, 2019 - 2025¹⁶). This discrepancy is illustrative of the degree to which cost projections can vary. It is also important to note that costs vary significantly by sector (see Table 6, above), which underscores the cost implications of shifting load allocations between sectors.

More information and analysis are needed to develop accurate cost projections for Phase III WIP implementation. Once developed, such projections can be compared to existing funding levels for Bay WIP implementation to gauge New York’s capacity to achieve remaining pollutant load reductions. To inform that analysis, the following section overviews New York revenue streams and funding programs for Bay restoration.

¹⁴ Allegany, Broome, Chemung, Chenango, Cortland, Delaware, Herkimer, Livingston, Madison, Oneida, Onondaga, Ontario, Otsego, Schoharie, Schuyler, Steuben, Tioga, Tompkins, and Yates (Bay watershed portion of each county only).

¹⁵ Those practices considered “primary” by the Chesapeake Bay Program. Cost data is also available for subcategories of BMPs (such as specific types of cover crops or manure management BMPs).

¹⁶ Chesapeake Assessment Scenario Tool. Scenario created 2/13/19.

II. Capacity of New York’s existing revenue streams to meet Bay restoration goals

Existing revenue sources and funding programs for Bay restoration

New York has several effective programs in place to fund environmental conservation activities statewide, most notably its Environmental Protection Fund, which as discussed below could be considered a model for other states in the Chesapeake Bay watershed seeking a dedicated source of funding for environmental initiatives. While most of New York’s funding programs do not focus exclusively on water quality restoration within the state’s portion of the Bay watershed, many are able to provide funds for such projects. Table 7 summarizes these key statewide funding programs for which Bay restoration projects are eligible to compete for funding.

Table 7. Major State Funding Programs Available to Support Chesapeake Bay WIP Implementation in New York

	Description	Applicable sector(s)
<i>Department of Agriculture and Markets</i>		
Agricultural Environmental Management (AEM) Base Funding	Noncompetitive technical assistance funding to NY’s Conservation Districts to support inventory, planning, and evaluation of BMPs on farms in priority watersheds.	Agriculture
Agricultural Nonpoint Source Abatement and Control Program (AgNPS)	Competitive financial assistance available to NY’s Conservation Districts to plan, design, and implement priority BMPs. Also provides cost-share funding to farmers to implement BMPs.	Agriculture
New York State Conservation Reserve Enhancement Program (CREP)	Provides annual rental payments and upfront incentives to agricultural landowners who voluntarily plant forested or vegetative buffers near streambanks to reduce erosion and polluted runoff.	Agriculture
<i>Department of Environmental Conservation</i>		
Chesapeake Bay Watershed Grant Program	Reimbursement grant program for conservation easements to protect and restore riparian buffers in the New York portion of Chesapeake Bay watershed.	Agriculture
Climate Smart Communities Program	Competitive funding to support the inventory, assessment, planning and implementation of municipal projects that address climate change (i.e. reduce flood risk, increase preparedness for extreme weather events, etc).	Stormwater, Wastewater
Wastewater Infrastructure Engineering Planning Grant Program	Competitive funding to help municipalities conduct initial planning of eligible Clean Water State Revolving Fund (CWSRF) water quality projects.	Wastewater
Water Quality Improvement Projects (WQIP) Grant Program	Competitive reimbursement grant program available to municipalities and nonprofits to implement projects that directly address documented water quality impairments or that protect a drinking water source.	Stormwater, Wastewater
<i>Department of Homes and Community Renewal</i>		
Community Development Block Grant (CDBG) Program	Provides funds to eligible communities for water quality, drinking water and stormwater projects that benefit low- and moderate-income people.	Stormwater
<i>Department of Parks, Recreation, and Historic Preservation</i>		
Parks Grant Program	Competitive funding for the acquisition, development and planning of parks and recreational facilities to preserve, rehabilitate or restore lands, waters or structures.	Various

Department of State		
Local Waterfront Revitalization Program	Funding for municipal projects that involve planning and implementation of waterfront improvements on designated inland waterways.	Various
Empire State Development		
Regional Council Capital Fund Grants	Competitive capital funding for economic development and job creation projects. Funds may be used for infrastructure investments including those related to water and sewer.	Wastewater, stormwater
Environmental Facilities Corporation		
Clean Water State Revolving Fund	Low- or no-interest financing for wastewater and water quality improvement projects. Funded by an annual grant from US EPA to the state with a required state match of 20%.	Wastewater, stormwater
Drinking Water State Revolving Fund	Low- or no-interest financing for municipally and privately-owned drinking water systems to make infrastructure improvements. Funds are available for new projects as loans are repaid.	Wastewater
Green Innovation Grant Program	Competitive grant funding for projects that improve water quality and demonstrate green stormwater infrastructure, especially in innovative ways.	Agriculture, stormwater
Integrated Solutions Construction Grant Program	Grant funding available to municipalities that receive Clean Water SRF financing, for projects that incorporate green infrastructure into CWSRF projects in order to achieve water quality benefits.	Stormwater
Intermunicipal Water Infrastructure Grants Program	Grants for drinking water and clean water projects that serve multiple municipalities (e.g. a shared water quality infrastructure project or interconnection of multiple municipal water quality infrastructure projects).	Wastewater, stormwater, septic
Septic System Replacement Program	Supports the replacement of cesspools and septic systems in priority geographic areas.	Septic
Water Infrastructure Improvement Act Grants Program	Grants to assist municipalities in funding drinking water and water quality infrastructure projects.	Wastewater, stormwater, septic

In addition to these state funding programs, New York deploys *federal* funding to protect and restore water resources within the state. Major sources include the US Department of Agriculture (particularly the Natural Resources Conservation Service and the Office of Rural Development), the US Environmental Protection Agency, and the National Fish and Wildlife Foundation. A list of key federal funding programs is included in the Appendix. Many of the funds for Chesapeake Bay restoration in New York flow through the Chesapeake Bay Program Office, which is part of US EPA’s Region 3 office. Other federal dollars from various agencies contribute to some of the state programs listed in the preceding table. Like other states in the Bay watershed, New York considers continued federal funding to be critical in meeting Bay TMDL goals.¹⁷

These public (state and federal) funds are augmented by municipal investments in water quality restoration, plus private sector funding from individuals (farmers, homeowners), businesses, philanthropic entities, and nonprofits.

¹⁷ See, e.g. DEC Commissioner Joseph Martens’ cover letter accompanying New York’s Phase II Watershed Implementation Plan: “DEC understands [...] that adequate levels of federal financial support will be necessary to implement and maintain these measures. Without adequate and consistent levels of federal funds over the next several years, New York will not be able to meet these TMDL commitments.” (New York Department of Environmental Conservation. January 7, 2013. *Final Phase II Watershed Implementation Plan for New York Susquehanna and Chemung River Basins and Chesapeake Bay Total Maximum Daily Load.*)

While a comprehensive accounting of all funds deployed to support New York’s Chesapeake Bay WIP is not available or possibly even feasible, Table 8 presents recent annual funding levels from the most significant of the state and federal funding programs highlighted above. While these programs make awards across the state of New York, the table shows the portion of funds that went to projects within the *Bay watershed* only. These figures were reported to US EPA by the New York Department of Conservation as required by the Chesapeake Bay Accountability and Recovery Act; they include state programs that “directly or indirectly protect, conserve, or restore living resources, habitat, water resources or water quality in the Chesapeake Bay watershed” in amounts of \$300,000 per year or more.¹⁸ Total average annual funding from all these sources is just over \$10 million.

Table 8. Recent Funding Levels for Chesapeake Bay WIP Implementation from Key Sources of State and Federal Funding

	2014 (\$)	2015 (\$)	2016 (\$)	2017 (\$)	2018 (estimated, \$)	Annual Average (\$)
State funding						
Agricultural Environmental Management (AEM) Base Funding*	759,000	922,000	1,020,000	997,684	937,252	927,187
Agricultural Nonpoint Source Abatement and Control Program (AgNPS)	2,700,000	3,472,326	2,554,339	4,627,642	3,500,000	3,370,861
Green Innovation Grant Program	2,452,090	1,121,774	1,168,081	1,309,357	1,199,737	1,450,208
Wastewater Infrastructure Engineering Planning Grant	514,000	225,600	455,255	261,871	314,242	354,194
Water Quality Improvement Projects (WQIP) Grant Program	64,506	981,321	4,324,811	115,919	2,738,846	1,645,081
Federal funding						
Clean Water Act Section 117(e)(1)(A) Chesapeake Bay Regulatory and Accountability Program Grants (CBRAP)	1,082,224	1,057,224	1,007,224	1,007,224	no data	1,038,474
Clean Water Act Section 604(b) Water Quality Management Planning Program Grants (Chesapeake Bay Implementation Grant)	1,199,654	1,699,654	1,699,654	1,699,654	no data	1,574,654
TOTAL						10,360,659

Source: New York Department of Environmental Conservation. March 2018. Communication with EFC-UMD.

* AEM figures are tracked on a county basis, and county lines do not correspond exactly with watershed boundaries.

This \$10 million total does not account for all annual Chesapeake Bay restoration funding in New York, as discussed above. Notably, approximately \$25 million per year is deployed in New York statewide from four major USDA programs (see Table 9), some portion of which is spent in the Bay watershed. Another \$185 million per year is made available through the Clean Water State Revolving Fund statewide. While not complete, however, this estimate provides a helpful point of comparison for the cost projections

¹⁸ US EPA. September 2016. *Chesapeake Bay Accountability and Recovery Act (CBARA) State Budget Reporting*. Available: https://www.epa.gov/sites/production/files/2016-11/documents/attachment17_cbarastatebudgetreporting.pdf

presented in the previous section, namely the CAST scenario suggesting that approximately \$173 million per year between 2019 and 2025 may be required to implement Phase II BMPs for New York’s agriculture, stormwater and septic sectors (this total would rise when accounting for implementation costs in the wastewater sector).¹⁹ BMP cost data from the Chesapeake Bay Program produced a higher estimate: \$420 million total per year to achieve remaining nutrient and sediment load reductions in the state’s agriculture, stormwater, and septic sectors.

Table 9. Recent Funding Levels from Major USDA Programs, New York Statewide

	2014 (\$)	2015 (\$)	2016 (\$)	2017 (\$)	Annual Average (\$)
Agricultural Management Assistance	515,900	404,100	399,600	332,600	413,050
Conservation Reserve Program	216,700	334,300	895,100	1,135,300	645,350
Conservation Stewardship Program	6,503,300	6,435,700	6,189,100	6,759,900	6,472,000
Environmental Quality Incentive Program	19,922,700	15,472,100	19,671,300	17,486,900	18,138,250
TOTAL					25,668,650

Sources: USDA. “AMA Total Obligations, by Fiscal Year.” Accessed 5/25/18: https://www.nrcs.usda.gov/Internet/NRCS_RCA/reports/fb08_cp_ama.html
 USDA. “CRP Total Obligations, by Fiscal Year.” Accessed 5/25/18: https://www.nrcs.usda.gov/Internet/NRCS_RCA/reports/fb08_cp_crp.html
 USDA NRCS Conservation Programs. “CSP Total Obligations, by Fiscal Year.” Accessed 5/25/18: https://www.nrcs.usda.gov/Internet/NRCS_RCA/reports/fb08_cp_cstp.html
 USDA NRCS Conservation Programs “EQIP Total Obligations, by Fiscal Year.” Accessed 5/25/18: https://www.nrcs.usda.gov/Internet/NRCS_RCA/reports/fb08_cp_eqip.html

Comparing estimated costs to achieve TMDL targets with recent funding levels – and considering that the pace of future pollution reductions must be maintained or increased compared to recent years – it seems clear that **greater levels of investment are needed if New York is to successfully achieve 2025 Chesapeake Bay TMDL pollutant load targets.** This funding could come from any or all sources, including private, federal, state, and municipal. However, in the event that federal funding for Bay restoration declines in coming years, the burden on other sources will be increased.

In addition to this need for greater levels of funding, there may be opportunities to enhance the state’s existing revenue streams and funding mechanisms for Bay restoration, so that they are more efficient and effective over the long term; this may include changing how funds are administered and apportioned so that they may be more directly targeted to the Chesapeake Bay watershed. To understand these opportunities, below we briefly profile four of the state’s major funding programs or sources for water quality protection and restoration: the Water Quality Improvement Projects (WQIP) Program, the Agricultural Environmental Management (AEM) Base Funding Program, the Agricultural Nonpoint Source Abatement and Control Program (AgNPS), and the New York State Environmental Protection Fund (EPF).

Water Quality Improvement Projects (WQIP) Program

Administered by the New York Department of Environmental Conservation, the Water Quality Improvement Projects (WQIP) Program funds projects that directly address documented water quality impairments, including wastewater treatment, nonagricultural nonpoint source pollution abatement,

¹⁹ Estimate generated via the Chesapeake Assessment Scenario Tool; see discussion in Section I.

aquatic habitat restoration, and municipal stormwater systems.²⁰ A competitive, statewide program, WQIP is open to municipalities and nonprofit organizations. Award amounts vary by project type, with cost share splits changing periodically; current rates are 75% of project costs for high priority municipal wastewater treatment improvement projects and municipal storm sewer system projects, 40% of costs for general wastewater infrastructure improvement projects, and up to 75% of costs for other projects.²¹

WQIP is capitalized primarily by the New York Environmental Protection Fund, an important statewide funding source that is discussed in greater detail below. Over the past five WQIP funding cycles, an average of \$49.5 million per year has been deployed statewide (see Table 10). Of this total, an average of \$1.6 million per year has been awarded within the Chesapeake Bay watershed.²² This represents about 4% of total funds, a relatively small portion considering the watershed comprises roughly 12% of New York’s land area.²³ However, this mismatch may be due to the fact that the watershed is fairly rural, while WQIP is focused on projects more common in urbanized areas, including stormwater systems, nonagricultural nonpoint pollution, and wastewater treatment systems. It also reflects the fact that there are fewer impaired waterbodies in this portion of the state compared to others. Currently, a total of up to \$79 million is available for the Round 15 WQIP cycle.²⁴

Table 10. Water Quality Improvement Project (WQIP) Program Awards, Statewide

WQIP Funding Round and Year	Total Funds Awarded
Round 10 – 2009	61,500,000
Round 11 – 2013	36,864,062
Round 12 – 2015	32,997,175
Round 13 – 2016	27,908,907
Round 14 – 2017	87,991,268
Annual Average	49,452,282

Sources: WQIP Round 14 Award List. Available: https://www.dec.ny.gov/docs/water_pdf/wqipr14awardlist.pdf. State of New York. Undated. WQIP Round 13 Award List. Available: https://www.dec.ny.gov/docs/water_pdf/wqipr13awardlist.pdf; State of New York. Undated. WQIP Round 12 Award List. Available: https://www.dec.ny.gov/docs/water_pdf/wqipr12awardlist.pdf; State of New York. Undated. WQIP Round 11 Awards List. Available: https://www.dec.ny.gov/docs/water_pdf/r11awardlist.pdf; New York State Department of Environmental Conservation. 2010. Water Quality Improvement Project Program: Round 10 Funding Awards. Available: https://www.dec.ny.gov/docs/water_pdf/wqipr10prsrld.pdf.

Priority for WQIP grants is given to projects that exhibit certain performance measures. These vary according to project type, but examples include location in a priority watershed as well as inclusion in a TMDL implementation plan, regulatory permit, or other watershed plan.²⁵ Priority ranking is also given for projects that demonstrate cost-effectiveness,²⁶ with maximum points awarded if a project

²⁰ New York Department of Environmental Conservation. Water Quality Improvement Project (WQIP) Program website. Accessed 3/6/18: <https://www.dec.ny.gov/pubs/4774.html>

²¹ Ibid.

²² WQIP average annual funding in Chesapeake Bay watershed for state fiscal years 2014-2017, per Ben Sears, New York Department of Environmental Conservation, March 2018.

²³ 6,400 square miles in New York’s Chesapeake Bay watershed compared to 54,556 square miles in the state as a whole.

²⁴ NYS DEC Water Quality Improvement Project (WQIP) Program website. Accessed 7/6/18: <https://www.dec.ny.gov/pubs/4774.html>.

²⁵ New York Regional Economic Development Councils. 2017. *Available CFA Resources*. Available: https://regionalcouncils.ny.gov/sites/default/files/2017-12/CFA_2017_Resource_Manual.pdf

²⁶ New York Department of Environmental Conservation. 2009. *Water Quality Improvement Projects Program Round 10: Information for Applicants*. Available: https://www.dec.ny.gov/docs/water_pdf/wqipr10info4app.pdf

demonstrates “exceptional value for the cost as it applies to both achieving the project objectives and being a fiscally sound project.”²⁷

Agricultural Environmental Management (AEM) Program and AEM Base Program Funding

New York’s Agricultural Management Program coordinates state and federal programs for agricultural conservation in the state. These programs provide financial and/or technical assistance to implement practices on priority farms and priority environmental issues, as determined by AEM. AEM administers USDA programs for conservation planning and BMP implementation, including the Agricultural Management Assistance Program, Conservation Reserve Program, Conservation Reserve Enhancement Program, Environmental Quality Incentive Program, and others (see Appendix).

In addition to coordinating the delivery of federal funds for agricultural conservation, AEM deploys the New York State AEM Base Program, which provides noncompetitive technical assistance funding to state Soil and Water Conservation Districts to plan and prioritize BMPs on priority farms. Funding does not support BMP implementation but rather the planning necessary for farms to access other state and federal sources for implementation.²⁸ AEM Base Funds support conservation organizations and consultants, who assist farmers with the development of comprehensive nutrient management plans.²⁹

The AEM Base Fund is capitalized entirely by the state Environmental Protection Fund. Initiated in 2005, the AEM Base Program has now assisted nearly a third of all farms in the state, with a total technical assistance grant value of \$2.32 million in 2016.³⁰ Funding to Conservation Districts whose service area includes the Chesapeake Bay (Susquehanna River) watershed has increased from \$380,000 per year in the program’s inaugural year to a current level of \$927,187 (four-year average).³¹

Important partners in implementing both the AEM Base Program and the AgNPS program discussed below are the Upper Susquehanna Coalition (USC) Soil and Water Conservation District (SWCD) member counties. A network of seventeen SWCDs in New York, plus four Conservation Districts in Pennsylvania, USC provides planning, design, and implementation assistance in addition to conducting advocacy and education, with the goal of protecting water quality in the headwaters region of the Susquehanna River. Since it was established in 1992, USC has been a key player in efforts to reduce agricultural pollution in New York’s Chesapeake Bay watershed.

Agricultural Nonpoint Source Abatement and Control Grant Program (AgNPS)

Deployed by the New York’s Department of Agriculture and Markets, AgNPS provides financial assistance on a competitive basis to New York’s Soil and Water Conservation Districts to plan, design, and implement priority BMPs. In addition, AgNPS provides cost-share funding to farmers to implement BMPs.³²

²⁷ New York Regional Economic Development Councils. 2017. *Available CFA Resources*. Available: https://regionalcouncils.ny.gov/sites/default/files/2017-12/CFA_2017_Resource_Manual.pdf

²⁸ New York State Soil & Water Conservation Committee. Agricultural Environmental Management Program Base Funding Program website. Accessed May 2, 2018: www.nys-soilandwater.org/aem/basefunding/html

²⁹ New York Soil and Water Conservation Committee. 2016. *2016 Annual Report: NYS Soil & Water Conservation Districts*. Available: https://www.nys-soilandwater.org/aem/forms/2016_Annual_Report.pdf

³⁰ New York Soil and Water Conservation Committee. 2016. *2016 Annual Report: NYS Soil & Water Conservation Districts*. Available: https://www.nys-soilandwater.org/aem/forms/2016_Annual_Report.pdf

³¹ AEM Base Program average annual funding in Chesapeake Bay watershed for state fiscal years 2014-2017. New York Department of Environmental Conservation. March 2018. Communication with UMD-EFC.

³² New York Department of Environmental Conservation. January 7, 2013. *Final Phase II Watershed Implementation Plan for New York Susquehanna and Chemung River Basins and Chesapeake Bay Total Maximum Daily Load*.

AgNPS is capitalized by the Environmental Protection Fund. Statewide annual funding levels have gradually increased from \$331,630 when the program was initiated in 1994 to an average of \$11 million today,³³ with more than \$15 million awarded in 2016.³⁴ As of 2013 when the Phase II Chesapeake Bay WIP was published, approximately 25% of all AgNPS funding had been deployed within the Chesapeake Bay (Susquehanna River) watershed.³⁵ Over the past four years, AgNPS funding within the watershed has averaged \$3.3 million – about 27% of the current statewide total.³⁶

Funding preference is given to projects that are located in the watershed of a priority waterbody (as defined by DEC), that address waterbodies with a TMDL implementation plan when the source of impairment is agriculture or that meet other performance standards.³⁷ It is important to note that AgNPS is a very competitive program, and because the Chesapeake Bay is not a New York priority waterbody with the state, TMDL-related water quality restoration efforts may not be considered a high priority.

Environmental Protection Fund

The New York State Environmental Protection Fund (EPF) is a major source of funding for environmental conservation activities statewide. Created by the state legislature in 1993, EPF is a permanent, dedicated fund that over time has “become one of the most significant sources of funding for State and municipal programs to preserve open space, improve parks and recreation programs, and protect water quality.”³⁸

EPF supports a wide range of programs, with funds administered and deployed by the New York Department of Environmental Conservation (DEC) as well as other state agencies and authorities including the Department of Agriculture and Markets; the Department of State; the Empire State Development Corporation; and the Office of Parks, Recreation and Historic Preservation. EPF includes five accounts: climate change mitigation and adaptation; EPF transfer; open space; parks, recreation and historic preservation; and solid waste.

The majority of EPF funding comes from the state’s Real Estate Transfer Tax (RETT). This revenue has comprised nearly 80% of total EPF funding since the Fund’s establishment through State Fiscal Year (SFY) 2016-17.³⁹ In addition, EPF is capitalized by several smaller sources, including revenue from the state’s beverage container program (unclaimed deposits plus penalties for violation of the container deposit law); proceeds from the sale or lease of state-owned underwater lands; service charges for conservation license plates; permit fees for regulated activities in wetlands; and others.⁴⁰

Annual EPF appropriations have grown significantly since the Fund was created. In its first year (SFY 1994-95), EPF received a budget appropriation of \$31.5 million. Its most recent appropriation – \$302

³³ \$79 million total between 2011 and 2017. Office of Governor Andrew M. Cuomo. 2017. Press Release: “Governor Proposes Next Round of Program Funding in 2017-2018 Executive Budget through Environmental Protection Fund.” Available:

<https://www.governor.ny.gov/news/governor-cuomo-announces-14-million-available-support-water-quality-protection-projects-farms>

³⁴ New York Soil and Water Conservation Committee. 2016. *2016 Annual Report: NYS Soil & Water Conservation Districts*. Available: https://www.nys-soilandwater.org/aem/forms/2016_Annual_Report.pdf

³⁵ New York Department of Environmental Conservation. January 7, 2013. *Final Phase II Watershed Implementation Plan for New York Susquehanna and Chemung River Basins and Chesapeake Bay Total Maximum Daily Load*.

³⁶ AGNPS average annual funding in Chesapeake Bay watershed for state fiscal years 2014-2017, per Ben Sears, New York Department of Environmental Conservation, March 2018.

³⁷ New York Department of Agriculture and Markets. 2017. *Agricultural Nonpoint Source Abatement Control Program Round 23 – Information for Applicants*. Available: https://www.agriculture.ny.gov/rfps/AGNPS_R23/R23_RFP.pdf

³⁸ Office of the New York State Comptroller. March 2018. *New York State’s Environmental Protection Fund: A Financial History*.

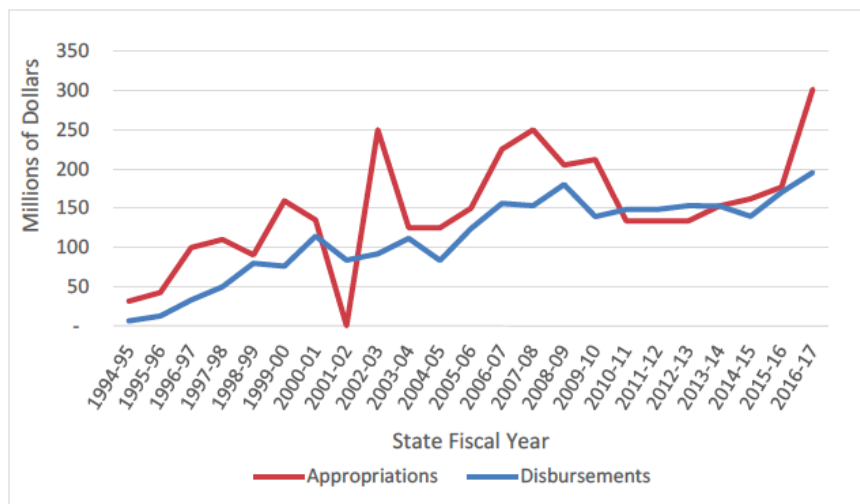
³⁹ RETT revenues deposited to the EPF have been statutorily capped at \$119.1 million annually since SFY 2010-11. Office of the New York State Comptroller. March 2018. *New York State’s Environmental Protection Fund: A Financial History*.

⁴⁰ For a complete list, see: Office of the New York State Comptroller. March 2018. *New York State’s Environmental Protection Fund: A Financial History*.

million in SFY 2016-17 – was the largest in its history, and about \$300 million is projected to be appropriated each year in the coming five fiscal years. Over the life of EPF, annual appropriations have averaged about \$148.1 million (see Figure 2.)

Figure 2. History of EPF Appropriations and Disbursements, 1994 through 2017

Source: Office of the New York State Comptroller. March 2018. *New York State’s Environmental Protection Fund: A Financial History*.



EPF disbursements have also risen over time, though they have historically lagged behind appropriations. Of the \$3.4 billion total appropriated to EPF over its lifetime, only about \$2.6 billion has actually been disbursed, with an average annual disbursement of \$113.2 million. This lag may be due in part to the fact that EPF funds capital projects, for which spending often spans multiple years. However, a 2010 audit by the New York Office of the State Comptroller also identified “excessive delays in the process for disbursing funds and weakness in project monitoring as reasons for burgeoning balances being carried by the EPF.”⁴¹

As a dedicated, permanent funding stream for environmental initiatives – and as a pay-as-you-go funding program that obviates the need for costly debt financing – EPF may be considered a model for other Bay states seeking to effectively finance water quality restoration. Nevertheless, the Fund has not been without its challenges. A major issue is EPF’s susceptibility to cash sweeps. On ten occasions between 2003 and 2016, EPF cash balances have been diverted to the state’s General Fund to provide budget relief. These sweeps have totaled more than \$953 million, less than half of which has been replenished.⁴² The Fund’s historically high account balances – reaching a record \$320.3 million in SFY 2001-02⁴³ – contributes to its susceptibility to such sweeps.

The New York Environmental Protection Fund may be considered a model for other Chesapeake Bay states seeking a dedicated, permanent source of funding for water quality restoration.

Other opportunities for improvement have been identified by the Office of the State Comptroller in the above-referenced 2010 audit as well as in a 2018 report.⁴⁴ Among these is the need for improved

⁴¹ Office of the New York State Comptroller. March 2018. *New York State’s Environmental Protection Fund: A Financial History*.

⁴² And funds that have been replenished have typically come from bond financing, which the state must repay with interest, reducing EPF’s value as a low-cost financing mechanism.

⁴³ Office of the New York State Comptroller. March 2018. *New York State’s Environmental Protection Fund: A Financial History*.

⁴⁴ *Ibid.*

assessment and reporting on statewide demand for EPF funds as well as total appropriations, disbursements, commitments, project costs, etc.⁴⁵ Additionally, the Office found that EPF may be foregoing potential revenue, as both RETT and the state's unclaimed bottle deposit program "generate revenue significantly in excess of the amount that State law directs to be deposited in the Fund."⁴⁶ Regarding the latter, enhanced monitoring and enforcement over the repayment of unclaimed bottle deposits could boost EPF funds.

Possibly more concerning than these issues, however, is EPF's trend toward increasing reliance on non-dedicated sources of funding, namely allocations from the state General Fund as well as bond proceeds. Between 2014 and 2017, transfers from the General Fund comprised a quarter of total EPF revenue, with one-time settlement funds (to repay cash sweeps) representing more than half that total. This trend is projected to continue, with the current EPF capital plan including an expectation of revenue from state personal income tax and/or sales tax revenue through 2023. As the Office of the State Comptroller noted, "such increased reliance on nonrecurring revenues, other General Fund receipts and borrowing could make the EPF more susceptible to unexpected cuts [and it] raises questions about its status as a dedicated Fund with permanent, committed resources going forward."⁴⁷

Key funding and financing needs

New York has strong funding programs in place to support water quality restoration across the state, including within the Chesapeake Bay watershed. Despite some challenges, the Environmental Protection Fund in particular is a model for dedicated, permanent funding for conservation initiatives. The state's key agricultural conservation programs (AEM, AgNPS) are well regarded and have provided stable levels of funding for BMP planning and implementation in New York's portion of the Bay watershed. In addition, while not a funding program, the Upper Susquehanna Coalition provides critical leadership and technical assistance capacity to the agriculture sector, with a long history of effectively partnering with the farming community in the upper Bay region.

These strengths lay the foundation for New York to effectively close remaining gaps in Chesapeake Bay funding and financing, specifically the need for greater levels of investment in practices that will enable the state to meet final Bay TMDL pollutant load targets. In addition, there may be opportunities to structure new and existing funding mechanisms in ways that augment their efficiency and impact, thereby achieving greater pollutant load reductions per dollar spent. Bay restoration targets may be also met more quickly if New York can effectively incentivize private sector capacity to finance and implement conservation practices. Strategies for advancing these goals are presented in the following section.

⁴⁵ Office of the New York State Comptroller. March 2018. *New York State's Environmental Protection Fund: A Financial History*.

⁴⁶ Ibid.

⁴⁷ Ibid.

III. Strategies for effectively funding Chesapeake Bay restoration in New York

As New York develops its Phase III WIP and charts a course to achieve final Chesapeake Bay TMDL pollutant load targets, both funding needs and funding availability will be primary factors for the state and its stakeholders to assess. The financing strategies presented below are intended to assist this effort by offering ideas for consideration as New York plans the implementation and financing of restoration practices. The first set of strategies addresses mechanisms for augmenting Bay restoration funding streams; the second focuses on ways to enhance the efficiency of state investments and to use these investments as a catalyst for private sector and market-based engagement in Bay restoration. The third set of strategies covers regulatory and incentive-based approaches for reducing pollutant loads from unregulated sources. The final set addresses the potential for programmatic advances, technological improvements, and augmented BMP tracking and reporting methods to reduce New York's cost of meeting TMDL targets. Throughout this section, case stories from the Chesapeake Bay region are provided to demonstrate successful implementation of various strategies.

Augment funding streams for Chesapeake Bay WIP implementation

As discussed in the preceding section, New York has effective statewide funding programs in place for environmental conservation activities, including water quality restoration. However, projects that advance Chesapeake Bay WIP implementation must compete against many other pressing needs statewide. New York's Chesapeake Bay watershed comprises only 12% of the state's total land area⁴⁸ and is home to just 3% of the total population. Yet given the federal mandate to reduce nutrient and sediment loads entering waterways in this region, New York's Southern Tier may require a disproportionately larger share of statewide water quality investments, especially over the coming six years as the state works to meet the 2025 TMDL deadline.

To maintain and accelerate progress toward TMDL goals, it will be necessary to increase funding for water quality initiatives in New York's Bay watershed so that this funding is both *sufficient* to achieve goals, as well as *stable* from year to year. Two basic approaches for augmenting Bay funding are presented below. The first involves targeting existing statewide funding programs to water quality improvement projects in New York's Southern Tier region, especially until TMDL goals have been met. This is not a perfect solution, because it involves shifting funds from other state priorities. However, it is appealing in that it does not involve creating new funding mechanisms or new funding programs, which could be slow to implement, would entail additional administrative burdens, and may not be an easy sell to the public or legislators.

Two basic approaches for augmenting Bay funding are to (1) target existing statewide funding programs to water quality improvement projects in New York's Southern Tier region and (2) generate funds for WIP implementation through new revenue mechanisms.

The second broad approach is to generate additional revenue for water quality restoration through taxes, fees, and debt financing. Because it is never politically or administratively easy to launch a new revenue mechanism, such an initiative would ideally be coupled with efforts to reduce compliance costs and leverage outside funds (concepts discussed later). Additionally, before introducing any major changes – whether creating a new revenue source or amending existing programs – it will be important to develop a

⁴⁸ 6,400 square miles in New York's Chesapeake Bay watershed compared to 54,556 square miles in the state as a whole.

reliable cost estimate for WIP implementation so that funds raised are sufficient to achieve desired impact, a critical element in building public support.

Dedicate a portion of the Environmental Protection Fund to the Chesapeake Bay watershed, and ensure the Fund's long-term stability

The Environmental Protection Fund is the most significant source of state funding for environmental conservation in New York, yet it does not provide dedicated funding for water quality restoration either statewide or within the Chesapeake Bay. Municipal and nonprofit initiatives to reduce water pollution are eligible to receive funding, but so are a wide diversity of projects such as municipal recycling, invasive species control, and park and zoo improvements. Statewide, demand for EPF grant money exceeds available funding, and projects within the state's Chesapeake Bay watershed are not always the most competitive projects. Notably, the Chesapeake Bay is one of the few watersheds in New York that does not receive a direct line item for funding the EPF.⁴⁹ The EPF's Open Space Account represents the majority of the EPF's annual appropriations and disbursements, and is the Fund's primary means for protecting and restoring watersheds and water quality in the state. While it could require legislative change, creating a direct line of funding for the Bay watershed would signal the state's commitment to achieving water quality goals in the Southern Tier region and it would be an effective way to ensure dedicated, reliable funding for WIP implementation.

Creating a direct line of EPF funding for the Bay watershed would signal the state's commitment to achieving water quality goals in the Southern Tier region and it would be an effective way to ensure dedicated, reliable funding for WIP implementation.

The success of this strategy depends on EPF's ongoing protection as a sustainable source of dedicated funds for conservation. As discussed above, the Fund's susceptibility to cash sweeps to fill General Fund shortfalls is particularly problematic. This vulnerability could be mitigated by disbursing funds expeditiously so that the Fund does not maintain high cash balances as it has in the past. This would also protect EPF from a trend toward increased reliance on General Fund transfers and planned bond financing, which are not stable, dedicated, or predictable revenue sources and could make EPF susceptible to unexpected cuts when General Fund balances are needed to respond to various budgetary needs. Additionally, steps should be taken to ensure that EPF is capturing its full revenue potential from both RETT and New York's unclaimed bottle deposit program, as recommended by the New York State Office of the Comptroller.⁵⁰

Secure additional funding from the AEM Base Program and/or WQIP

The AEM Base Funding Program is supported by an annual allocation from New York State's Environmental Protection Fund. Since the program is designed to provide non-competitive funding to soil and water conservation districts (SWCDs) state-wide, enabling all districts to participate at the same funding level, it may not be feasible to prioritize the Chesapeake Bay watershed for funding. However, the demand for assistance from the AEM Base Program is generally greater than available funding, supporting the argument for a state-wide increase in allocation to the program. Additional funds within the New York portion of the Chesapeake Bay watershed could be used to support a regional or multi-county planner or other technical staff to help prepare projects for implementation funding.

⁴⁹ Lauren Townley, New York Department of Environmental Conservation. 6/12/18. Communication with EFC.

⁵⁰ Office of the New York State Comptroller. March 2018. *New York State's Environmental Protection Fund: A Financial History*.

Beyond the AEM program, there are opportunities to target the Chesapeake Bay watershed in New York for funding through competitive agricultural cost-share programs, such as the Agricultural Nonpoint Source Abatement and Control Program (AgNPS). This program is also funded through the EPF to provide technical assistance and financial incentives in order to help farmers prevent water pollution from agriculture. While the EPF does target specific watersheds for priority AgNPS funding, the Chesapeake Bay is one of the few watersheds in the state that does not receive a direct line item for funding through this program. Just as the EPF assists other watershed organizations in the state in protecting and enhancing regional water quality, it is recommended that the EPF include a specific category to assist the Upper Susquehanna Coalition in implementing the state's Chesapeake Bay WIP.

As noted previously, WQIP is an important statewide funding source for addressing water quality improvements, with an average of nearly \$50 million awarded annually over the past five funding cycles. Even so, with only about 4% of total WQIP award funding directed toward projects within the Chesapeake Bay watershed – a region comprising 12% of the state's land area – the opportunity exists to capture a greater share of this important statewide funding source.

Under WQIP's current grant application scoring rubric, maximum points are awarded for projects exhibiting certain performance measures, including those projects that address waterbodies identified as impaired on the state Priority Waterbodies List, or are the subject of a TMDL, TMDL implementation plan, or other watershed plan.⁵¹ Because the Chesapeake Bay lies well outside the borders of New York, it is not on the state Priority Waterbodies List, and there is no apparent mechanism for considering restoration efforts for water quality impairments not within the state.

The most recent water quality assessments for the Chemung and Susquehanna basins – which would drive development of watershed plans and TMDLs – were completed in 2004 and 2009, respectively, prior to development of the Chesapeake Bay TMDL. Water quality in these watersheds was generally considered to be satisfactory to very good. With relatively few water quality impairments, TMDLs or other watershed plans, these watersheds may not be high priorities for WQIP funding. That said, although the focus of water quality restoration efforts for the Chesapeake Bay lies outside of the state, the water quality assessments for both the Chemung and Susquehanna basins acknowledge that nutrient and sediment loads from New York contribute to the Bay impairment, and that efforts to reduce pollutant inputs to the Chemung and Susquehanna should be considered high priority water quality restoration goals deserving greater support.⁵²

It is unclear whether or not the Bay TMDL or the state's WIP may have been counted in the scoring for funding of any proposed or awarded WQIP-funded project in the past. However, it does seem clear that, more generally, there is no explicit mechanism in place to prioritize scoring and award maximum points to address water quality restoration efforts for impairments that may have pollutant sources within the state, but occur downstream of the state's borders. Updating the WQIP scoring rubric to address this gap may help improve the chances for targeting funding toward the Chemung and Susquehanna basins.

It is also important to note that prior to an uptick in funding in 2017, WQIP funding totals had been steadily decreasing over the previous four funding cycles, from \$61.5 million awarded statewide in 2009

⁵¹ New York Regional Economic Development Councils. 2018. *Available CFA Resources*. Available: http://regionalcouncils.ny.gov/sites/default/files/2018-04/2018ResourcesAvailableGuide_0.pdf.

⁵² New York Department of Conservation. 2004 and 2009. *2004 Chemung River Basin WI/PWL – Basin Assessment*. Available: https://www.dec.ny.gov/docs/water_pdf/pwlchmgasmt.pdf; and *2009 Susquehanna River Basin WI/PWL – Water Quality Assessment*. Available: https://www.dec.ny.gov/docs/water_pdf/pwlsusqasmt.pdf

to \$27.9 in 2016.⁵³ While the reversal of this trend is encouraging, a state commitment to ensuring appropriate and consistent funding is essential in order for the program to remain and, perhaps, improve, as a source of funding source for Chesapeake Bay protection and restoration.

Use Clean Water State Revolving Funds to support nontraditional water quality protection efforts in the Southern Tier, including nonpoint source and green infrastructure projects

The Clean Water State Revolving Fund (CWSRF) can be a significant source of funding for water quality and watershed protection efforts. While the Fund has traditionally been targeted toward wastewater infrastructure needs, Title VI of the federal Clean Water Act authorizes the use of this program for other types of projects as well. There is a history of CWSRF being used for nontraditional projects, supported by EPA guidance, since the program's inception in 1990. Such projects focus on agricultural nonpoint sources, urban green infrastructure, or improving water or energy efficiency; eligible recipients include both public and private entities. Options for funding can include loans, loan guarantees, credit enhancements, and other types of financial assistance. Potential issues facing nontraditional projects include a lack of a stable revenue source for repayment, administrative challenges, and limitations posed by state statutes or policies.⁵⁴

There are precedents for using Clean Water State Revolving Funds for nontraditional projects, including agricultural nonpoint pollution reduction, urban green infrastructure, and other initiatives to improve surface water quality.

At the state level, the CWSRF is administered through the Environmental Facilities Corporation, providing interest-free or low-interest financing to municipalities and non-municipal entities throughout the state for both traditional wastewater treatment projects, and non-traditional projects related to the preservation, improvement or protection of water quality. Financial assistance is limited to projects that are consistent with area-wide water quality plans (such as a TMDL).⁵⁵ Given the significant reductions still needed from non-wastewater sources in order to meet 2025 nutrient and sediment targets, New York's CWSRF program is a viable funding option for projects targeting pollution from agricultural nonpoint source, decentralized wastewater treatment systems (including septic, or on-site, systems), and municipal stormwater runoff.

Access less traditional funding sources for Bay restoration

Another opportunity to augment funding for Chesapeake Bay water quality improvement projects is to tap into funding sources that may have the potential to support both their original purpose, as well as implementation of New York's Chesapeake Bay WIP. This may require creative packaging of projects, along with novel ways of thinking about water quality protection and restoration. The benefit of this approach of targeting less traditional funding sources is that it does not involve shifting money from one program to another, nor does it mean proposing new, often difficult to find, dollars for WIP implementation. Several potential opportunities are presented below.

⁵³ Sources: State of New York. Undated. WQIP Round 13 Award List. Available: https://www.dec.ny.gov/docs/water_pdf/wqipr13awardlist.pdf; State of New York. Undated. WQIP Round 12 Award List. Available: https://www.dec.ny.gov/docs/water_pdf/wqipr12awardlist.pdf; State of New York. Undated. WQIP Round 11 Awards List. Available: https://www.dec.ny.gov/docs/water_pdf/r11awardlist.pdf; New York State Department of Environmental Conservation. 2010. Water Quality Improvement Project Program: Round 10 Funding Awards. Available: https://www.dec.ny.gov/docs/water_pdf/wqipr10prslawrd.pdf.

⁵⁴ U.S. Environmental Protection Agency. May 2017. *Financing Options for Nontraditional Eligibilities in the Clean Water State Revolving Fund Programs*. EPA Publication number 830B17003. Available: https://www.epa.gov/sites/production/files/2017-05/documents/financing_options_for_nontraditional_eligibilities_final.pdf.

⁵⁵ New York Environmental Facilities Corporation. Clean Water State Revolving Fund. Accessed 6/22/18: <https://www.efc.ny.gov/cleanwater>.

Climate Smart Communities. Administered by the Office of Climate Change in the New York Department of Environmental Conservation, the Climate Smart Communities grant program funds “inventory, assessment, planning and implementation projects that advance the work of municipalities in addressing climate change.”⁵⁶ Priorities in the recent (2017) funding round included flood risk reduction, preparedness for extreme weather conditions, mitigation activities related to transportation and food waste, and specific activities related to the Climate Smart Communities municipal certification program. Projects and activities related to increasing or preserving natural resiliency, relocating or retrofitting critical infrastructure, replacing or right-sizing flow barriers, and climate smart land use planning not only enhance climate-change readiness, but also have the potential to protect and improve water quality through nutrient and sediment load reduction.

Proposals to the Climate Smart Communities program need not specifically identify, nor even plan for, Chesapeake Bay WIP implementation as a goal in order for the program to be beneficial. However, only a small handful of communities found in New York’s Southern Tier counties – those comprising the upper Chesapeake Bay watershed – currently participate in the program.⁵⁷ With a total of \$9.5 million, and a maximum award of \$2 million, available to communities in the 2017 round, this represents a significant untapped opportunity to improve not only climate resiliency, but also water quality in the Bay watershed.

Community Risk and Resiliency Act (CRRRA) Provisions. Enacted in 2014, the CRRRA amends the state Environmental Conservation Law to require certain state regulations, permits, and funding programs to “consider the effects of climate risk and extreme-weather events”⁵⁸ as of 2017. CRRRA includes five main provisions, among them a “consideration of sea-level rise, storm surge and flooding activity in siting, permitting and funding.”⁵⁹ Permitting programs identified under this provision with the potential to affect water quality in the Bay watershed include protection of waters, sewerage service, mined land reclamation and freshwater wetlands. Funding programs include the Water Pollution Control Revolving Fund, open space acquisition, open space project operation and maintenance agreements, landfill closure assistance, local waterfront revitalization, and agricultural and farmland protection. Other pertinent provisions of the CRRRA include those associated with smart growth around public infrastructure, and guidance on natural resiliency measures.

While not a source of funding in and of itself, the CRRRA directive to consider the effects of climate change could have ripple effects on other environmental goals, including Bay WIP implementation. Projects or programs focused on WIP implementation would be strengthened by highlighting the dual benefit of climate resiliency and consistency with the main provisions of the CRRRA.

Community Development Block Grant Program (CDBG). The CDBG Program is a federal program authorized by Title I of the Housing and Community Development Act, providing grants to smaller

⁵⁶ New York Regional Economic Development Councils. 2017. *Available CFA Resources*. Available: https://regionalcouncils.ny.gov/sites/default/files/2017-12/CFA_2017_Resource_Manual.pdf

⁵⁷ New York Department of State Climate Smart Communities, Participating Communities. Accessed 7/3/18: <https://climatesmart.ny.gov/actions-certification/participating-communities/>.

⁵⁸ New York State Department of Environmental Conservation. “Community Risk and Resiliency Act (CRRRA) Provisions.” Accessed 6/4/18: <http://www.dec.ny.gov/energy/104113.html>

⁵⁹ New York State Department of Environmental Conservation. “Community Risk and Resiliency Act (CRRRA) Provisions.” Accessed 6/4/18: <http://www.dec.ny.gov/energy/104113.html>

communities to ensure decent, affordable housing; create jobs; direct community and economic development activities toward neighborhood revitalization; and provide improved facilities and services. New York State's agency for administering this program is the Office of Community Renewal. Eligible applicants include cities, towns and villages in non-entitlement areas with a population under 50,000, and counties with an unincorporated population under 200,000.⁶⁰

Although funding for this program is not directly intended to address water quality issues at the watershed level, eligible projects targeting water, sewer, and stormwater infrastructure improvement at the community scale have the potential to positively impact water quality downstream. All of the seven counties in New York's Southern Tier that are entirely or predominantly within the Chesapeake Bay watershed are considered potentially eligible to apply for funding within the CDBG program. These counties contain five cities, 50 villages, and 127 towns, all of which are also potentially eligible, and most of which are within the watershed.⁶¹ Furthermore, certain public infrastructure projects that are co-funded with other sources, such as USDA Rural Development or New York's Environmental Facilities Corporation, may qualify for a higher funding threshold.⁶²

Cornell Local Roads Local Technical Assistance Program (LTAP). Housed at Cornell University, the Cornell Local Roads Program LTAP Center "provides training, technical assistance, and information to municipal officials and employees responsible for the maintenance, construction, and management of local highways and bridges in New York State."⁶³ One of more than 50 LTAP centers nationwide established by the Federal Highway Administration (FHA), the program is funded by FHA, Cornell University, and the New York State Department of Transportation.

Trainings geared toward highway workers and municipal officials are typically scheduled one per county throughout the state each year, with the goal to also accommodate municipalities that request a course. Topics vary depending on need but can range from engineering to management to roadside drainage and stormwater control. Technical assistance can take the form of a telephone consultation, referral to a local professional, or scheduling an onsite visit by program technical staff.

Although roadway conveyances in New York are not identified as a major source of sediment or nutrient loading to the Chesapeake Bay, these features are recognized in the state's Phase II WIP as a potential target for reduction if other stormwater load reduction goals are not being met. The WIP also recognizes the Southern Tier Central Regional Planning and Development Board's 2012 *Susquehanna-Chemung Action Plan*, which devotes an entire section to recommendations and actions regarding roads and roadway drainages. Both documents note LTAP as a resource for addressing stormwater issues related to road drainage and maintenance of roadway conveyances. Coordination between LTAP's work and the upper Chesapeake Bay watershed could perhaps be enhanced by formalizing the connections between the program and the counties and municipalities in the watershed. This could mean targeting training and other LTAP resources specifically to address stormwater and water quality issues in the watershed; educating

⁶⁰ New York Office of Homes and Community Renewal, New York State Community Development Block Grant (CDBG) Program: Program Guidelines. Accessed 8/2/18: <http://www.nyshcr.org/Programs/NYS-CDBG/ProgramGuidelines.htm>.

⁶¹ New York Office of Homes and Community Renewal, New York State Community Development Block Grant (CDBG) Program: Eligible Communities by County. Accessed 8/2/18: <http://www.nyshcr.org/Programs/NYS-CDBG/EligibleCommunitiesByCounty.htm#a4>.

⁶² New York Office of Homes and Community Renewal, New York State Community Development Block Grant (CDBG) Program: Program Guidelines. Accessed 8/2/18: <http://www.nyshcr.org/Programs/NYS-CDBG/ProgramGuidelines.htm>.

⁶³ Cornell University. "Cornell Local Roads Program." Accessed 6/4/18: <http://www.clrp.cornell.edu/clrp/about.html>

managers and municipal officials in the watershed of the LTAP program and the resources available to them; and providing dedicated program funding to LTAP through the NYS DOS and the FHA specifically to address challenges and recommendations for implementing New York's Bay WIP.

Appalachian Regional Commission (ARC). The ARC is a federal-state partnership that seeks to “innovate, partner, and invest to build community capacity and strengthen economic growth in 420 counties across the 13 Appalachian states,” including New York.⁶⁴ ARC works in partnership with the New York Department of State to invest in New York projects in the following five priority areas: creating economic opportunity; preparing a ready workforce; building critical infrastructure; leveraging natural and cultural assets; and cultivating leadership and community capacity.⁶⁵ In its most recent fiscal year, ARC made 19 grants statewide totaling \$3.9 million.⁶⁶

It is noteworthy that twelve of the fourteen counties that make up the Appalachian region in New York are either fully or partially within the Chesapeake Bay watershed. This presents a ready-made opportunity for investment in ARC's priority goals to be leveraged in support of protection and restoration of the Chesapeake Bay, and implementation of New York's Bay WIP. Program funding should emphasize and give extra weight to innovative projects that recognize proposed investment in transportation and water and wastewater infrastructure benefitting both the regional economy and regional environmental health, particularly surface water quality. Similarly, leveraging the region's natural heritage in order to strengthen community and economic development is really only viable if that natural heritage is valued and protected. Directing ARC funds to projects that help implement the state's Bay WIP therefore serves the purposes of both programs.

Local Waterfront Revitalization Program. New York's Waterfront Revitalization of Coastal Areas and Inland Waterways Act provides local governments the opportunity to participate in the Coastal Management Program by preparing and adopting a Local Waterfront Revitalization Program (LWRP).⁶⁷ This program, administered by the New York Department of State's Office of Planning and Development, and funded by the Environmental Protection Fund, is open to any community along the state's coast or designated inland waterway. LWRP supports development not only of comprehensive planning documents to address the spectrum of uses and challenges facing water bodies and waterfronts, but also programs at the community level to implement these plans.

While the goals of the program are not specific to water quality protection, environmental sustainability and restoration are necessary components of any plan, especially issues of land and water use, water and wastewater infrastructure, and environmentally-sensitive landscapes. Although it may be contrary to the program's intent to give preference to communities within the Bay watershed, both the Susquehanna and Chemung Rivers as well as a number of their major tributaries, are included among the state's designated inland waterways, making communities

⁶⁴ Appalachian Regional Council. 2017. “Fiscal Year 2017 State Profile: New York.” Available: https://www.arc.gov/images/appregion/fact_sheets/NewYorkFactSheet2-18.pdf

⁶⁵ Appalachian Regional Council. 2017. “Fiscal Year 2017 State Profile: New York.” Available: https://www.arc.gov/images/appregion/fact_sheets/NewYorkFactSheet2-18.pdf

⁶⁶ Appalachian Regional Council. 2017. “Fiscal Year 2017 State Profile: New York.” Available: https://www.arc.gov/images/appregion/fact_sheets/NewYorkFactSheet2-18.pdf

⁶⁷ New York State Department of State, Office of Planning and Development. Local Waterfront Revitalization Program. Accessed 7/5/18: <https://www.dos.ny.gov/opd/programs/lwrp.html>.

along these waters eligible for funding (the city of Binghamton has an LWRP that was approved in 2005). These communities should be identified and encouraged to make full use of this financial resource available to them.

Evaluate the need for new revenue sources

The preceding strategies involved capturing a greater share of existing state funding sources. New York may also consider implementing *new* dedicated revenue streams for Chesapeake Bay WIP implementation in the form of taxes or fees. While not likely to be a politically popular choice, this is one of the main tools a state has at its disposal to generate sufficient and stable funding. Revenue from any new tax or fee structure could be used to buttress existing funding programs or it could be used to capitalize a new fund, perhaps in combination with a new direct line of funding from the EPF.

One alternative in this category is a tax on nutrient and sediment discharges. 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 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.⁶⁸ An example is Fairfax County, Virginia's stormwater tax, which assesses 1 cent per \$100 of property value on properties within a designated assessment district.⁶⁹ This mechanism differs slightly from a stormwater fee, as discussed below. There are barriers associated with implementing a pollution tax, including the challenge of identifying an appropriate tax 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, especially if the tax is assessed statewide but revenue flows only to the Southern Tier. 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.

Given the general aversion to tax increases, *fees* are a potentially more palatable option. Fees differ from taxes 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. To be politically acceptable, fees generally need to be directly linked to the cost of providing the service and applied uniformly and fairly to all beneficiaries (though perhaps exemptions could be made for certain entities), and funds raised through the fee need to be applied exclusively to providing the service.

Fees should be linked to the cost of providing a service, assessed uniformly on all beneficiaries of the service, and applied exclusively to providing that service.

Pennsylvania and Delaware have recently considered statewide fees to fund water quality initiatives. Pennsylvania's proposed Water Resource Usage Fee would be assessed on large withdrawals of water – greater than 10,000 gallons per day – by consumers such as utilities, golf courses, and nuclear power plants. The proposed rate is 1 cent per 100 gallons if the water is eventually returned to its source, and 1

⁶⁸ Experimental Economics Center. "Advantages of Green Taxes." Accessed 9/29/16: <http://www.econport.org/content/handbook/Environmental/pollution-control-revised/Advantages.html>

⁶⁹ Water Environment Federation. Undated. "The Stormwater Challenge" slide deck. Available: https://www.epa.gov/sites/production/files/2017-01/documents/session_5_french.pdf

cent per 10 gallons if it is not returned to its source. Municipal water plants and agricultural users would be exempt. Based on current usage rates, the fee has the potential to generate \$245 million annually.⁷⁰

Delaware's proposed Clean Water Fee would be assessed on a per-household and per-business basis, with rates based on property value. Tax-exempt properties would be assessed a reduced rate, and agricultural properties would be assessed under separate rules. Parcels in towns with stormwater utilities would also receive fee reductions. The proposed fee could generate \$30 million per year for flood abatement and water quality projects throughout the state.⁷¹

It is important to note that depending on how a fee mechanism is structured, it could be argued that it functions more like a tax than a fee. This was the case with **Maryland's Bay Restoration Fund**, a "fee" assessed on residents served by wastewater treatment plants or on-site sewage disposal systems and used to upgrade treatment plants.⁷² While this fee actually operates more like a tax than a fee, 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 any new statewide fee/tax, it will behoove state leaders to focus messaging on the mechanism's potential to achieve goals.

Maryland's Bay Restoration Fund is a good example of a dedicated revenue mechanism that is accomplishing its intended purpose – reducing nitrogen pollution to local waterways and the Chesapeake Bay.

Another fee-based option is the stormwater utility fee. While a local rather than state funding source, stormwater fees are increasingly being used around the country to provide a sufficient, equitable, and dedicated source of funding for stormwater management. By shifting the responsibility for managing – and financing – stormwater to the local level, significant efficiencies can be achieved. New York's Chesapeake Bay watershed has 26 regulated MS4 communities, none of which has a stormwater utility fee system in place.

More than half of all states have enacted enabling legislation that provides local governments and municipalities the authority to establish stormwater utilities and associated fees to support their stormwater management programs.⁷³ In New York, however, no such law has been passed and the legal framework for stormwater utilities appears to be somewhat murky. A recent legal analysis found that "while there is no prohibition in state law that clearly states municipalities are not authorized to implement user fees for stormwater costs, there is also no law that clearly enables this approach."⁷⁴ New York's state constitution does grant local governments broad home rule powers to adopt local laws,⁷⁵ but clear enabling legislation for stormwater fees would signal to municipalities the importance of advancing sustainable local funding streams to reduce stormwater pollution. This is a critical first step, but the state

⁷⁰ PA Environment Editorial Board. 6/6/16. "Rep. Sturla Water Use Fee Bill Would Generate \$245 Million/Year for Water Programs." *PA Environment Digest*. Available: <http://paenvironmentdaily.blogspot.com/2016/06/rep-sturla-water-use-fee-bill-would.html>

⁷¹ Montgomery, Jeff. 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/>

⁷² 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>

⁷³ National Association of Clean Water Agencies. 2016. "Navigating Litigation Floodwaters: Legal Considerations for Enacting, Implementing & Funding Stormwater Programs". Available: <http://www.nacwa.org/docs/default-source/news-publications/White-Papers/2016-11-04stormwaterwhitepaper.pdf?sfvrsn=2>.

⁷⁴ Feller, B. 2007. "Municipal Separate Storm Sewer System (MS4) Funding Document. Available: [http://www.dec.ny.gov/docs/water_pdf/funddocdraft\(1\).pdf](http://www.dec.ny.gov/docs/water_pdf/funddocdraft(1).pdf), cited in Gruber, S. 2018. "Emerging Stormwater Management Options in New York: Review of the City of Ithaca Stormwater User Fee Case Study." Available: <http://hudsonvalleyregionalcouncil.org/wp-content/uploads/2018/05/Implementing-stormwater-user-fee-in-Ithaca-final-draft-1-30-2018.pdf>

⁷⁵ New York State Department of State Division of Local Government Services. 2015. "Adopting Local Laws in New York State." Available: https://www.dos.ny.gov/lg/publications/Adopting_Local_Laws_in_New_York_State.pdf

could offer further support for the adoption of stormwater fees through outreach, training, and technical assistance, as well as incentives such as priority review or bonus points on state grant applications or a reduction in required local match for funding programs.

Beyond taxes and fees, a third core option for generating capital is bond financing. This mechanism can infuse funds into immediate needs. However, it has the disadvantage of imposing a long-term liability on the state and costing more over the long term, as loans must be repaid with interest. New York state can issue general obligation bonds, which are supported by the state's taxing power and typically must be voter-approved, as well as revenue bonds, which are repaid by specified tax or other revenue generated by the project (common examples include toll roads, bridges, and hospitals).⁷⁶ Other potential options include green bonds, the proceeds of which are dedicated to implementing environmental needs such as water quality practices, as well as public building authority bonds, which can often be used for wastewater treatment plants, combined sewer separation projects, and stormwater projects.

Leverage private sector capital and capacity to support Bay restoration

With Chesapeake Bay TMDL deadlines quickly approaching and state and federal resources increasingly limited, there is compelling reason to take steps to leverage private sector investment in restoration activity. In addition to directly partnering with private sector firms to implement practices more quickly and cost effectively, the state could implement approaches to make public investments function in a market-like manner, which could further incentivize private sector involvement.

Engaging private capital markets in water restoration has been a topic of considerable recent interest across the Chesapeake Bay watershed. It was a focus of the 2016 Chesapeake Bay Environmental Finance Symposium,⁷⁷ and the US EPA Environmental Finance Advisory Board (EFAB) recently investigated opportunities to improve access to private markets in the Bay region, finding that "there is insufficient public financing and public/private grant funding to design, implement, and complete water quality restoration projects at a scale necessary to meet Chesapeake Bay-wide water quality goals."⁷⁸ The ideas discussed below could help set the stage for New York to more effectively engage the private sector and the marketplace in support of water restoration priorities.

Enable and pursue strategic public-private partnerships

New York 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.⁷⁹ P3s can be used for an entire project or for selected aspects, such as financing, design, construction, operations and maintenance, and monitoring and evaluation.

⁷⁶ New York State Division of Budget. "New York Bonds" website. Accessed 6/12/18: <https://bonds.ny.gov/bonds/BYNB-bondsTypes.html>

⁷⁷ See: Environmental Finance Center, University of Maryland. August 2016. *Chesapeake Bay Environmental Finance Symposium: Recommendations and Final Report*. Available: https://www.chesapeakebay.net/channel_files/24763/environmental_finance_symposium_final_report_9-1-16.pdf

⁷⁸ US EPA Environmental Finance Advisory Board. 2018. *Charge: Chesapeake Bay – Improving Access to Private Capital Markets*.

See also the final white paper: Environmental Finance Advisory Board. November 2018. *Illustrative Private Equity Capital Model: Chesapeake Bay Water Quality Project*.

⁷⁹ The National Council for Public-Private Partnerships. "7 Keys to Success." Accessed 2/14/19: <https://www.wateronline.com/doc/the-keys-to-successful-public-private-partnerships-0001>

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 the Clean Water Partnership in Prince George’s County, Maryland, which requires that a certain percentage of project activities be conducted by small, local, and minority-owned businesses.⁸⁰

While state and local governments will still need to identify a reliable revenue stream (taxes, fees, grants, tolls, revolving loan funds, etc.) to support the project, a P3 may be able to better manage and leverage this revenue, thus stretching dollars further. P3 arrangements are also particularly valuable in cases when it is important to reduce public sector risk or to avoid adding public sector capacity.

New York has engaged in some design-build contracts (a partial P3) for public infrastructure projects, but it has not extensively utilized full public-private partnerships.⁸¹ In fact, while P3 enabling legislation has been introduced in the New York state legislature on multiple occasions, it has not yet been passed (whereas 35 other states in the country have such statutes in place).⁸²

To harness the cost- and time-saving potential of P3s in New York, the first step is to enact P3 authorization legislation that allows both state and local governments to engage in public-private partnerships to develop and manage public projects, including installing and maintaining stormwater infrastructure. The National Conference of State Legislatures’ 2014 report *Public-Private Partnerships for Transportation: A Toolkit for Legislators* provides guidance on developing such legislation.⁸³ With this legislation in place, the state could consider engaging in or incentivizing the use of P3s, especially for stormwater management.

A good model of a large-scale stormwater P3 is the above-mentioned **Clean Water Partnership in Prince George’s County, MD**. Launched in 2015, the partnership is a 30-year agreement between the County and Corvias Solutions, a private stormwater management firm. Its aim is to install green infrastructure practices on up to 4,000 acres of impervious surface throughout the county, in order to ensure compliance with federal MS4 permit requirements. Corvias will manage the design, construction, and long-term maintenance of stormwater infrastructure, and the County has committed to invest \$100 million in the first four years to construct projects on 2,000 acres. The Clean Water Partnership is unique in its scale – it is attempting to manage urban stormwater and meet federally mandated requirements *county-wide*. 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. While the partnership is still in its early stages, the County expects it will “maximize the efficiencies and savings for the entire life cycle of the green infrastructure assets,”⁸⁴ as well as transfer risks associated with construction and maintenance from the public sector to the private sector.

⁸⁰ Prince George’s County, MD. “Clean Water Partnership” website. Accessed 6/14/18: <https://www.princegeorgescountymd.gov/2865/Clean-Water-Partnership>

⁸¹ Lewis, R. February 5, 2018. “Proponents push for PPPs in New York.” *City & State New York*. Available: <https://www.cityandstateny.com/articles/policy/infrastructure/proponents-push-ppps-new-york.html>

⁸² US Department of Transportation, Federal Highway Administration. “State P3 Legislation” website. Accessed 6/13/18: <https://www.fhwa.dot.gov/ipd/p3/legislation/>

⁸³ National Conference of State Legislatures. 2010 (updated 2014). *Public-Private Partnerships for Transportation: A Toolkit for Legislators*. Available: <http://www.ncsl.org/research/transportation/public-private-partnerships-for-transportation.aspx>

⁸⁴ Prince George’s County Clean Water Partnership website. “Frequently Asked Questions.” Accessed 7/20/14: <http://thecleanwaterpartnership.com/faqs/>

A more informal, noncontractual option for engaging private firms is a corporate sponsorship or pledge program, which would publicly acknowledge and reward corporations for committing to invest in conservation practices. One recent example of such a program within the Chesapeake Bay watershed is the **Turkey Hill Clean Water Partnership**, a conservation effort in Pennsylvania funded by an NRCS Conservation Innovation Grant and coordinated by the Alliance for the Chesapeake Bay, in partnership with the Maryland and Virginia Milk Producers Cooperative Association and the Turkey Hill Dairy company. Turkey Hill has committed to pay their milk suppliers a premium for their milk, once farmers adopt a conservation plan to reach environmental compliance through on-the-ground practices. The goal of the program is to not only promote greater private sector conservation efforts, but also to create an incentive program that other businesses can replicate.⁸⁵

While this particular program may not have the same impact in New York – with a CAFO permitting program that already requires the development of Comprehensive Nutrient Management Plans and compliance with more stringent technical standards than some of its neighbors – this is one example of a voluntary incentive effort to encourage even greater environmental stewardship and enhance private conservation efforts within the state’s Chesapeake Bay watershed. Such a program could target highly visible corporations and other commercial enterprises with a significant presence in the stormwater or agriculture sectors. One company that fits this profile is the yogurt producer Chobani, which has a large presence in the region and has already committed to environmental stewardship.⁸⁶ An enhanced pledge or certification program that explicitly addresses land management or water quality could spur the company and its suppliers to strive for even higher conservation standards that result in a greater reduction of agricultural pollutant loads. With about 690 dairy farms containing over 68,000 cows in the seven counties that are entirely or predominantly within the Bay watershed in New York,⁸⁷ this type of model may be applicable to additional dairy companies or cooperatives in the region, especially those with smaller suppliers who may not be subject to the same CAFO regulations or engineering standards as larger operations.

Adopt a comprehensive performance-oriented financing approach in state funding programs

Performance-oriented financing can be a powerful tool for reducing implementation costs and engaging the private sector. This approach focuses on the desired outcome (pounds of nutrients or sediments reduced) rather than the means to get there (particular BMPs or projects). Paying for results instead of projects provides the incentive that project implementers need in order to find the most cost-effective and highest-performing practices, thereby maximizing the impact of public dollars spent. It also provides clear expectations and rules of engagement, key enabling conditions for securing the participation of private sector partners.

New York has already demonstrated a proclivity toward performance-driven financing. Many state funding programs award bonus points for applications that exhibit certain performance measures, such as location in a priority watershed or inclusion in an approved TMDL implementation plan. WQIP awards bonus points for cost-effective projects: those that promise “exceptional value for the cost as it applies to both achieving the project objectives and being a fiscally sound project.”⁸⁸

⁸⁵ Alliance for the Chesapeake Bay website. “Alliance Partners with Turkey Hill for Cleaner Water in Pennsylvania”. Accessed 8/7/2018: <https://www.allianceforthebay.org/2018/06/alliance-partners-with-turkey-hill-for-cleaner-water-in-pennsylvania/>.

⁸⁶ See Chobani’s website for its statement about committing to environmental conservation: <https://www.chobani.com/impact/the-chobani-way/>

⁸⁷ New York Department of Agriculture and Markets. 2016. New York State Dairy Statistics: 2016 Annual Summary. Accessed: <https://www.agriculture.ny.gov/DI/NYSAnnStat2016.pdf>.

⁸⁸ New York Regional Economic Development Councils. 2017. *Available CFA Resources*. Available: https://regionalcouncils.ny.gov/sites/default/files/2017-12/CFA_2017_Resource_Manual.pdf

These examples lay the groundwork for New York to take a more robust and systematic approach toward performance-driven financing. This could be pursued through an explicit policy adopted by existing state funding programs, or the approach could be integrated into a new Bay restoration financing entity or Bay restoration fund (ideas discussed later in this section). Either way, a performance 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 specific performance-based financing mechanism that New York 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 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.⁸⁹

Investigate the potential to participate in Chesapeake Bay water quality trading

The potential of markets to achieve environmental goals more quickly, effectively, and at lower cost than traditional regulatory approaches is well documented.⁹⁰ Water quality trading (WQT) in particular is a market mechanism that has received much attention in the Bay watershed. Unlike standard agriculture and stormwater pollution controls which require discharges to be addressed on site, WQT allows regulated entities to meet permit requirements by purchasing reductions elsewhere, which in principle maximizes efficiency.

Although no nutrient or sediment trading programs have been established in New York, there are several successful models of trading markets throughout the Chesapeake Bay watershed. The District of Columbia has gained national attention for its Stormwater Retention Credit Trading Program, through which landowners who voluntarily install stormwater practices can generate and sell credits to permitted entities that are required to reduce stormwater loads. Virginia has a well-established nutrient trading program, which includes a phosphorus offset system to mitigate the impact of new development in perpetuity. Though the program does not currently address existing pollution, it is a good example of a comprehensive market-based offset program. Maryland has a legislatively authorized trading program and regulatory guidelines in place. Though no trades have been completed to date, the Maryland Department of Environment recently proposed nutrient trading regulations to address pollution from

⁸⁹ 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.

⁹⁰ See e.g. Shortle, James. April 2013. "Economics and Environmental Markets: Lessons from Water-Quality Trading." *Agricultural and Resource Economics Review* 42/1.

point sources, stormwater, and onsite septic systems, and the Department has been authorized by statute to use a portion of monies in the state Bay Restoration Fund to catalyze certain trades. These developments increase the likelihood of stepped-up trading activity in the future.

A statewide nutrient or sediment credit trading program in New York could be challenging to design and implement in a way that benefits the Chesapeake Bay, in part because demand for credits would likely come from other parts of the state (i.e. areas with a large number of permitted entities such as MS4s and wastewater treatment plants), yet the Bay watershed would need to meet local water quality goals before being able to sell credits to these potential purchasers. A trading program confined to the state's Bay watershed would also be likely to encounter a mismatch between credit suppliers (mostly agricultural producers) and credit purchasers (as wastewater treatment plants and regulated stormwater entities are not common in the region). While the New York Department of Environmental Conservation is willing to consider a wastewater trading and offset program among permitted dischargers, the agency contends that there is currently no demonstrated need for such a program among existing facilities in order to accomplish the objectives of the Chesapeake Bay WIP.⁹¹

A truly watershed-wide Chesapeake Bay water quality trading market may have more to offer New York credit generators. This concept has been under discussion throughout the watershed;⁹² such a system would allow nutrient and sediment reductions to be generated and sold across the watershed, once local (sub-watershed) water quality mandates are met. Rather than creating market infrastructure from scratch, this system could be enabled by integrating the various existing state programs in a way that enables trades to occur smoothly and cost-effectively across jurisdictions. The state's Agricultural Environment Management program could help position farmers to take advantage of a trading market, should one emerge, by documenting existing and potential future environmental improvements on New York's farms and serving as a critical first step in the verification process.⁹³ While not without its challenges (technical, logistical, political), such a system offers great opportunity to reduce the overall cost of compliance and accelerate implementation of Bay restoration goals. As New York continues to consider the role of water quality trading and/or nutrient credit trading markets in meeting its own water quality goals, it should seek a prominent seat at the table in ongoing conversations about Bay-wide trading.

Direct economic development investments to industries that support water quality restoration

While not a direct water quality financing mechanism, an opportunity to reduce pollutant loads while advancing other local and regional priorities (e.g. economic growth and job creation) is to proactively integrate restoration into broader economic development initiatives. Specifically, this approach would involve prioritizing public investments in business development toward markets and industries that are supportive of water quality protection and restoration.

There are several potential opportunities in this arena. One is to direct public economic development subsidies to clean water industries. A number of sectors with good growth potential – including sustainable agriculture, eco-tourism, nature-based recreation, and municipal green infrastructure – are

⁹¹ New York Department of Environmental Conservation. January 7, 2013. *Final Phase II Watershed Implementation Plan for New York Susquehanna and Chemung River Basins and Chesapeake Bay Total Maximum Daily Load*. Available: http://www.dec.ny.gov/docs/water_pdf/finalphaseiiwip.pdf

⁹² It was a main topic at the Chesapeake Bay Environmental Finance Symposium; see EFC's 2016 report *Chesapeake Bay Environmental Finance Symposium: Recommendations and Final Report*. Available: https://www.chesapeakebay.net/channel_files/24763/environmental_finance_symposium_final_report_9-1-16.pdf

⁹³ New York Department of Agriculture and Markets. 2007. *Agricultural Environmental Management 2006-2007 Annual Report*. Available: <https://www.nys-soilandwater.org/aem/forms/2006AnnualReport.pdf>

predicated on clean water and healthy ecosystems. Investment in these sectors could not only attract new businesses and create jobs but also would be supportive of efforts to maintain water quality.

A related opportunity is to offer incentives to launch and/or expand innovative initiatives that both generate revenue and function as restoration practices in and of themselves. Some examples might include freshwater aquaculture, cultivating fruit and nut trees within forest buffers, and installing waste-to-energy systems. All of these have capacity not only to create jobs but also to improve water quality. New York's Chesapeake Bay region may benefit if state and/or regional economic development entities foster such innovative enterprises through startup incubators, business development assistance programs, entrepreneurial training, accelerator programs, revenue bonds for seed funding, or similar efforts.

Finally, there is the opportunity to target investments in BMPs that also support the local economy. A study conducted by UMD-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.⁹⁴ Predicting, documenting and promoting the economic impact of water quality investments could help make the case for additional public expenditures to install conservation practices. This approach – using water quality investments to spur local economic development activity – is a core element of the previously-discussed Clean Water Partnership stormwater P3 in Maryland.⁹⁵

Authorize an independent financing entity to deploy Bay restoration funds

Implementation of several of the previously-discussed strategies could be facilitated by employing this next concept, which is to authorize a financing authority to hold and disperse Bay restoration funds with a high degree of autonomy and flexibility. This entity could be newly established, or it could take the form of an existing institution whose capacity and mandate is expanded. In either case, essential characteristics include the capability to (1) pool capital from various sources including state and federal agencies, private investors, and even philanthropic donors, so that public funding can more effectively be used in concert with these sources of capital; (2) deploy funds to high-yield projects, investing when effective projects are ready to be funded, not necessarily when public budgeting cycles dictate; (3) establish performance criteria for water quality investments and award funding based on this criteria (and adapt criteria as new information becomes available over time); and (4) facilitate water quality trades within a state or regional credit financing system, should a water quality trading program be established in New York.

Such a scenario offers several advantages over standard state financing methods (i.e. grant programs administered by various state agencies), and/or it could complement these existing mechanisms. Being able to pool multiple funding streams together introduces efficiencies that come with scale, and it presents an option to use public funds as a catalyst for attracting private sector investment. Untethered from public budgeting cycles and “use it or lose it” provisions, the entity would have flexibility in the timing of investments and could smooth out fluctuations in yearly funding levels, providing a greater level of predictability (year-to-year funding fluctuations are currently a challenge with EPF and WQIP). Further, funds housed in an enterprise program would be protected from being redirected to fill budgetary shortfalls. Separated from regulatory programs, funds could also be invested with a more exclusive focus

⁹⁴ University of Maryland Environmental Finance Center. 2013. *Stormwater Financing Economic Impact Assessment: Anne Arundel County, MD; Baltimore, MD; Lynchburg, VA.*

⁹⁵ Prince George's County, MD. “Clean Water Partnership” website. Accessed 6/14/18: <https://www.princegeorgescountymd.gov/2865/Clean-Water-Partnership>

on water quality performance goals. All of this is critical for leveraging private capital, as the private sector values predictability, clear expectations, and measurable outcomes.

Examples of finance authorities that function in this way include the Pennsylvania Infrastructure Investment Authority (PennVEST) and the Rhode Island Infrastructure Bank (RIIB). PennVEST was created in 1988 and is a 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.⁹⁶ 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,⁹⁷ with funding 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.⁹⁸ The agency has capacities described 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 it deems likely to achieve strong results.

The Rhode Island Infrastructure Bank (RIIB) was established in 1989 to implement water and wastewater loan financing through the State Revolving Fund, and it is now a standalone state agency guided by a board of directors. RIIB's charter was expanded in 2015, and the agency now implements a variety of financing programs across multiple areas including energy, transportation, and brownfields. It offers diverse financing resources in addition to traditional subsidized loans, such as Commercial Property Assessed Clean Energy or C-PACE financing, sewer tie-in grants, and resilience project investments.

In New York, a potential candidate to assume the role of a water quality financing entity with the broad authority described here is the Environmental Facilities Corporation (EFC). A public benefit corporation, EFC's mission is to "assist communities throughout New York State to undertake critical water quality infrastructure projects by providing access to low-cost capital, grants, and expert technical assistance."⁹⁹ EFC's core funding programs are the Clean Water State Revolving Fund (administered in partnership with DEC) and the Drinking Water State Revolving Fund (administered in partnership with the state Department of Health). It also manages the Water Infrastructure Act, the Green Innovation Grant Program, and the Wastewater Infrastructure Engineering Planning Grant. In addition to traditional financing of grants and low-cost loans, EFC seeks to use "an innovative approach to developing and advancing new financing strategies to maximize the funding that can be made available" to municipalities and other clients.¹⁰⁰

Opportunities for expanding EFC's role would depend on New York's interest in authorizing a financing entity similar to PennVEST or RIIB, as well as the specific capabilities deemed desirable. It would also depend on an evaluation of EFC's existing capacity. One option might be to administer some or all funds for Chesapeake Bay water quality restoration, including any new allocations from EPF or other sources. Another could be to expand EFC's scope beyond water quality, so that it may engage in multisector financing opportunities (economic, social, environmental). Financing mechanisms could also be expanded beyond traditional grants and loans to include water quality or nutrient credit trading. Even

⁹⁶ 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>

⁹⁷ Paul Marchetti, PennVEST. Communication with EFC, 6/15/17.

⁹⁸ Brion Johnson, PennVEST. 2012. "Financing Clean Water Projects for Pennsylvania" presentation. Available: <http://www.dvrpc.org/EnergyClimate/WSTP/pdf/Presentations/Pennvest.pdf>

⁹⁹ New York State Environmental Facilities Corporation. "About EFC" website. Accessed 6/13/18: <https://www.efc.ny.gov/about>

¹⁰⁰ Ibid.

more innovative would be to employ a mitigation banking approach, through with EFC would purchase credits from established water quality restoration banks, particularly those with that meet high standards for performance and cost savings. By ensuring that reductions are achieved prior to financing, the banking approach shifts the risk to the supplier. If used for voluntary or unregulated reductions, rulemaking for this model would be less cumbersome than it would be in a regulated market. While EFC is a statewide entity, it would be capable of targeting investments to the Chesapeake Bay watershed, and it could engage with any watershed-wide initiatives (such as a Bay credit trading market, if it emerges) to the benefit of New York’s Southern Tier.

Capture a greater share of unregulated pollutant loads

Another category of strategies includes regulatory and incentive-based approaches. While these options would not create new funds or change how New York finances restoration, they may be able to help narrow the state’s TMDL funding and implementation gap. Watershed modeling indicates that a large portion of New York’s agriculture and stormwater pollutant loading comes from non-regulated sources (see Table 11). This is particularly striking in the state’s agriculture sector, where only a tiny fraction of the nutrient or sediment comes from regulated sources (e.g. confined animal feeding operations), as New York’s agricultural water quality improvement programs are largely voluntary in nature. In the stormwater sector, 83% of the sector’s total nitrogen load and 86% of its phosphorous and sediment loads stem from unregulated sources, namely areas that are not subject to MS4 requirements.

Table 11. Percentage of total pollutant loads from non-regulated sources in New York’s agriculture and stormwater sectors, 2016

Sector	Nitrogen	Phosphorous	Sediment
Agriculture	98.9%	98.8%	99.9%
Stormwater	83.9%	86.4%	86.2%

Source: US Environmental Protection Agency Chesapeake Bay Program. TMDL Tracker. Progress data updated 6/15/2017.

Expand regulatory regimes in the stormwater and agriculture sectors

If New York were to impose tighter restrictions on emitters of agricultural and stormwater pollution, this would effectively shift some of the restoration cost from the state to regulated entities, who may be in a better position to find cost efficiencies. Options might include lowering the threshold for agricultural operations that are required to receive a Confined Animal Feeding Operation permit, making nutrient management planning mandatory in the agriculture sector and for certain landowners in the stormwater sector, and tightening pollution load limits in urban stormwater permits. However, such expanded regulatory programs would require additional staff time and costs to administer, and new regulations are not likely to be politically popular.

Further incentivize voluntary conservation practices on unregulated lands

Another option for reducing unregulated pollutant is to expand incentive-based strategies for private landowners to implement best management practices. New York already does this extensively in the agriculture sector through a range of direct subsidies including grants, cost-share programs and rental or lease payments. Additional financial incentives for installing conservation practices, specifically on agricultural lands, include tax incentives, lending tools, and insurance products.

Research indicates that farmers view tax credits as favorably as direct payments as a form of compensation for conservation activity, and that tax credits are equally or more effective at reducing

nutrient pollution than standard technical and financial assistance.¹⁰¹ In New York, the majority – 87.5% – of farms are family-owned operations, rather than corporations or partnerships.¹⁰² For family-owned farm operations, any tax deductions are taken on personal income tax returns. Income tax deductions for conservation-related expenses are already allowed at the federal level. Federal tax code permits farmers to deduct expenditures made for “the construction, control, and protection of diversion channels, drainage ditches, irrigation ditches, earthen dams, watercourses, outlets, and ponds” but not for depreciable items such as tanks, pipes, or pumps.¹⁰³

New York’s state tax code should be audited to ensure that costs associated with installing and maintaining BMPs are eligible for business expense deductions on personal income tax returns. Additionally, the state should accelerate efforts to integrate tax credit programs with conservation regulations and could even consider strengthening the conservation components of these program’s eligibility requirements. For example, New York’s Agricultural Assessment Program reduces property tax assessments on farmland but does not require conservation BMPs to be in place. Additionally, the state’s Forest Tax Law provides tax incentives for forest landowners who implement forest management plans; watershed management uses are allowed but not required. These demonstrate the need for a formal evaluation of the state’s tax code to ensure the state is capitalizing on important opportunities to incentivize water quality protection.

A good example of a conservation tax credit program is Pennsylvania’s **Resource Enhancement and Protection (REAP)** program. Administered by the Pennsylvania State Conservation Commission, REAP enables farmers, landowners or businesses to earn tax credits for implementing BMPs that enhance farm production and protect natural resources, such as manure storage systems, alternative manure treatment practices, grassed waterways, rotational grazing systems, no-till planting equipment, cover crops and stream bank fencing.¹⁰⁴ Farmers receive a state income tax credit equal to 50-75% of the cost of BMP installation, up to \$150,000 per farm, and tax credits may be used incrementally as needed for up to 15 years. To be eligible for REAP, farmers must be on schedule to implement their Conservation Plan, Nutrient Management Plan, and/or Manure Management Plan.¹⁰⁵ Tax credits are earned after the BMP is installed, and the tax credit must be returned if the practice is not maintained over its lifespan.

Lending incentives operate by embedding conservation requirements into the financial products that farmers regularly access – for example, loans to purchase land or buy new equipment. One option is for the state to subsidize or buy down interest rates on loans that incorporate desired conservation components, perhaps prioritizing loans made in high priority watersheds. The state could also provide credit enhancements on loans that include BMP installation provisions. Credit enhancements are additional collateral, insurance or third-party guarantees attached to a loan that provide the lender with assurance that the borrower will honor the obligation.¹⁰⁶ In both of these scenarios, agricultural operators would enjoy the benefit over the term of the loan, provided that the promised BMP is maintained over its lifespan (ongoing reporting and monitoring would need to be built into the program).

¹⁰¹ Abrams, Ryan. "The Problem of Nutrient Pollution: Lessons from Florida's Fragmented Approach." *University of Denver Water Law Review*. 17 (2013): 207.

¹⁰² USDA Economic Research Service. "State Fact Sheets: New York." Last updated 5/24/18.

https://data.ers.usda.gov/reports.aspx?StateFIPS=42&StateName=Pennsylvania&ID=17854#P34ed63f6a7cc4b66a13ce7381661fc0c_3_428i15C0x0

¹⁰³ 26 C.F.R. § 1.175–2. Definition of soil and water conservation expenditures.

¹⁰⁴ Pennsylvania Department of Agriculture. "Resource Enhancement and Protection (REAP)" website. Last accessed 2/28/19:

https://www.agriculture.pa.gov/Plants_Land_Water/StateConservationCommission/REAP/Pages/default.aspx

¹⁰⁵ *Ibid.*

¹⁰⁶ Investopedia. "Credit Enhancement." Last accessed 2/28/19: <http://www.investopedia.com/terms/c/creditenhancement.asp>

If the farmer were to default on his/her commitment to install and maintain the BMP, the interest rate would return to market value and the borrower could also be required to pay back the subsidy.

Subsidized insurance products offered in return for investment in conservation activities are a way to reduce agricultural operators' environmental impact and also their operational risk. Because subsidized insurance premiums require a relatively low level of investment, but can generate significant pollution reductions, they represent a way to effectively leverage public conservation investment dollars. The USDA Risk Management Agency (RMA) manages the federal crop insurance program, overseeing the activities of private crop insurance companies nationwide who insure agricultural operators against crop loss or damage. The 2014 Farm Bill established conservation compliance as a requirement for crop insurance subsidies,¹⁰⁷ and RMA currently provides additional support in the form of waived fees and greater subsidies to special categories of producers, such as beginning farmers and ranchers, as well as organic producers. However, New York could work with private insurers to offer deeper insurance subsidies to projects that go beyond minimum conservation requirements, are located in high priority sub-watersheds, and/or to that install specific practices identified in the Chesapeake Bay WIP.

It should be noted that New York is not alone in having a high proportion of agricultural and stormwater pollutant loads coming from unregulated sources. This is an issue throughout the Chesapeake Bay watershed, and discussions about how to capture these unregulated loads are ongoing. The Chesapeake Stormwater Network (CSN), a nonprofit advocacy and education organization based in Ellicott City, Maryland, is piloting a program in four Pennsylvania counties to explore this topic. CSN's project seeks to understand what incentive options are available to capture unregulated loads, as well as which ones actually motivate behavior change. Findings from this pilot program will be relevant for New York and other Bay states.

Review state and federal funding programs for opportunities to maximize the effectiveness and efficiency of investments

New York may be able to reduce its overall cost of compliance and accelerate attainment of TMDL targets through improved tracking of voluntarily-installed BMPs, technological advancements in restoration practices, and enhancements to the Chesapeake Bay Watershed Model. Additionally, it may be possible to find administrative efficiencies and/or programmatic improvement opportunities within state and federal funding programs, so that a greater share of available funds flow to implementing restoration practices.

Some of these advances – such as better tracking and reporting of implemented BMPs, as well as improved accounting for such practices in the Bay Model – could, in effect, reduce the cost of compliance by showing that New York is closer to pollution reduction targets than modeling currently indicates. Proposed efforts to improve tracking and reporting of agricultural BMPs were outlined in the Phase II WIP, and implementation of several such programs have been established. Among these is a program developed by the Upper Susquehanna Coalition to track and report both cost shared and non-cost shared agricultural BMPs among member SWCDs, and to submit this data to the Chesapeake Bay Program via the Environmental Information Exchange Network. The USC also partners with the NYS DEC on related programs to collect and record cost shared and non-cost shared BMP data for CAFO farms, and to

¹⁰⁷ Conservation compliance dates to 1985, but between 1996 and 2014, it was decoupled from the federal crop insurance program.

establish and implement agricultural BMP verification protocols. These protocols were subsequently used by SWCDs to verify and report practices being used on all farms in the Bay watershed.¹⁰⁸

Other strategies – such as finding program efficiencies and accelerating advancements in technology so that BMPs remove greater pollutant loads at the same or lower cost – free up dollars that may then be invested in additional compliance practices. A related way to stretch funds is to target investments toward BMPs that have been proven to be effective, and toward those installed in targeted watersheds where they are likely to have the greatest impact on pollutant loads. A study in Pennsylvania found that choosing cost-effective BMP portfolios – defined as “a set of practices assigned to locations that minimizes the costs of satisfying nitrogen, phosphorus, and sediment load allocation targets in each Chesapeake Bay jurisdiction” – could reduce that state’s cost of compliance by an impressive 36%.¹⁰⁹ As discussed above, New York does prioritize many of its grant funds to projects that are located in priority watersheds or listed in a TMDL implementation plan. Further study may enable finer targeting of investments, by identifying the subwatersheds and practices with the highest potential pollution reduction impact per dollar spent. Taking it a step further is to shift from targeted practices and geographies to targeted *outcomes* – this is the concept behind performance-driven financing, as previously discussed. State funding programs and federal programs administered at the state level should be evaluated periodically to ensure they are taking advantage of such opportunities to maximize efficiency and impact.

¹⁰⁸ New York Department of Environmental Conservation. 2018. *New York Chesapeake Bay Restore Clean Water Action Items: Final 2016-2017 Programmatic Milestones*. Available: https://www.dec.ny.gov/docs/water_pdf/nyfinal17fms.pdf.

¹⁰⁹ 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

Conclusion

As New York develops its Phase III Chesapeake Bay WIP, the authors of this report hope the recommendations offered herein are a fruitful contribution to the conversation, and that they advance New York's efforts to sufficiently and efficiently fund water quality restoration within its borders and beyond. As it enters into the final phase of the Bay WIP implementation, New York has an opportunity to increase investment in pollution reduction practices that will enable it to meet TMDL targets on schedule and simultaneously to pursue innovative financing approaches that will make these investments go as far as possible in achieving results.

Appendix

Major Federal Funding Programs Available to Support Chesapeake Bay WIP Implementation in New York

<i>Department of Agriculture</i>
Natural Resources Conservation Service
Agricultural Management Assistance Program
Conservation Reserve Enhancement Program
Conservation Reserve Program
Conservation Stewardship Program
Debt for Nature Program
Emergency Watershed Protection Program
Environmental Quality Incentive Program
Farm and Ranch Lands Protection Program
Farmable Wetlands Program
Grassland Reserve Program
Regional Conservation Partnership Program
Wetland Reserve Program
Watershed and Flood Prevention Operations Program
Rural Development
Water & Waste Disposal Predevelopment Planning Grants
Water and Waste Disposal Loan & Grant Program in New York
<i>Environmental Protection Agency</i>
Clean Water Act (CWA) Section 319 Nonpoint Source Management Implementation Grants
CWA Section 117(d) Technical Assistance and General Assistance Grants
CWA Section 117(e)(1)(A) Chesapeake Bay Implementation Grants (CBIG)
CWA Section 117(e)(1)(A) Chesapeake Bay Regulatory and Accountability Program Grants (CBRAP)
CWA Section 604(b) Water Quality Management Planning Program Grants
Urban Small Waters Grants
<i>National Fish and Wildlife Foundation</i>
Chesapeake Bay Stewardship Fund
<i>National Oceanic and Atmospheric Administration</i>
Chesapeake Bay Watershed Education and Training